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ANNOUNCEMENT OF THE
TWENTY-SEVENTH SUMMER SESSION
JULY 8—AUGUST 16
1918

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This announcement is intended to give detailed information to prospective students in the Summer Session of Cornell University.

For general information concerning the University and the work in its various colleges during the academic year, the requirements for admission, etc., the General Circular of Information should be consulted. This and the other publications of Cornell University are listed on the last page of the cover of this pamphlet. Any one of the informational publications there mentioned will be sent gratis and post-free on application to the Secretary of Cornell University, Ithaca, New York.

CALENDAR

SUMMER SESSION 1918

In order to get the full number of exercises announced for the Summer Session, it is necessary that all work begin promptly on Tuesday morning, July 9. Students are, therefore, urged to reach Ithaca in time to be present at the first exercise in each class. If possible, they should register on Monday, July 8; if not, they should register on Tuesday during the hours not occupied in class work.

July 8, Monday,	8 a. m. to 5 p. m. Registration at office of Registrar.
July 9, Tuesday,	Instruction begins at times and places announced under each course. Registration continued.
July 9, Tuesday evening,	Organ Recital, Sage Chapel.
and following Tuesdays,	
July 11, Thursday evening,	Pianoforte Lecture-Recital by Mr. E. R. Kroeger, Barnes Hall.
and following Thursdays,	
July 13, Saturday, before 1 p. m.	Last day for payment of fees at the Treasurer's Office, 1 Morrill Hall.
July 14, Sunday evening,	Organ Recital, Bailey Hall.
and Aug. 14,	
July 15, Monday evening,	First lecture in Monday evening course. Continued on following Mondays. Rockefeller Hall.
July 21, 28, Aug. 4,	Community Singing, Bailey Hall.
August 15, 16, Thursday and Friday,	New York State Examination for Teacher's Certificates.
August 16, Friday,	Summer Session closes.

SUMMER SESSION 1918

OFFICERS

Jacob Gould Schurman, LL.D., President of the University.
 George Prentice Bristol, A.M., Director of the Summer Session.
 David Fletcher Hoy, M.S., Registrar of the University.

*STAFF OF INSTRUCTION

Arthur A. Allen, Ph.D., Assistant Professor of Ornithology.	Ornithology
Ruth V. Atkinson, Instructor in Physical Training.	Physical Education
Leila Bartholomew, Teacher of Music, Grammar Schools, Ithaca.	Music
Charles Clarence Bidwell, Ph.D., Instructor in Physics.	Physics
Julian Pleasant Bretz, Ph.D., Professor of American History.	History and Government
Leslie Nathan Broughton, Ph.D., Assistant Professor of English.	English
Arthur Wesley Browne, Ph.D., Professor of Chemistry.	Chemistry
Laura Bryant, Supervisor of Music, Ithaca Public Schools.	Music
Murray Wright Bundy, M.A., Instructor in English.	English
Clayton Joseph Buttery, M.A., Instructor in Romance Languages.	French
Ellen Brainard Canfield, Instructor in Physical Training.	Physical Education
Walter Buckingham Carver, Ph.D., Assistant Professor of Mathematics.	Mathematics
Hamlin E. Cogswell, Mus.M., Supervisor of Music, Washington, D. C.	Music
Ralph T. K. Cornwell, Assistant in Chemistry.	Chemistry
Frank H. Cowles, Ph.D., Professor of Latin, Wabash College.	Latin
James Edwin Creighton, LL.D., Professor of Philosophy.	Philosophy
Hollis Dann, Mus.D., Professor of Music.	Music
Marcelle Delattre, Teacher of French, Washington, D. C.	French
Charles Love Durham, Ph.D., Professor of Latin.	Latin
Ellsworth David Elston, B.A., Instructor in Physical Geography.	Physical Geography
Clyde Olin Fisher, M.A., Instructor in Economics.	Economics
John Edward Fogelson, M.A., Instructor in Chemistry.	Chemistry
Jean Marius Gelas, Instructor in U. S. Military Academy, West Point.	Physical Training
Roswell Clifton Gibbs, Ph.D., Assistant Professor of Physics.	Physics
Allan H. Gilbert, Ph.D., Instructor in English.	English
David Clinton Gillespie, Ph.D., Assistant Professor of Mathematics.	Mathematics
Frank Alexander Griffin, Assistant in Chemistry.	Chemistry
J. Earl Griffith, Head of Department of Drawing and Art, Central High School, Newark, N. J.	Drawing and Art
Othon Goepp Guerlac, Licencié ès lettres, LL.B., Assistant Professor of French.	French History
William H. Hoerrner, Professor of Music, Colgate University.	Music
Louis Benjamin Hoisington, B.A., Instructor in Education.	Education
Helen Allen Hunt, Teacher of Music, Boston, Mass.	Music
Wallie Abraham Hurwitz, Ph.D., Assistant Professor of Mathematics.	Mathematics
Stuart Deming Jackson, B.A., Assistant in Chemistry.	Chemistry
Arthur Edward Johnstone, Teacher of Music, New York City.	Music
Lester Spruce Kennell, M.A., Instructor in Romance Languages.	Spanish
Ernest R. Krøger, Teacher of Music, St. Louis, Mo.	Music
William Edward Lunt, Ph.D., Professor of History, Haverford College.	History
James Frederick Mason, Ph.D., Professor of Romance Languages.	French
David E. Mattern, B.A., Teacher of Music, Ithaca Public Schools.	Music

*The names of the instructors in the College of Agriculture are given on page 53

Edith H. Matzke, M.D., Adviser of Women.	Hygiene
Victor Elvert Monnett, B.A., Assistant Professor of Geology, University of Oklahoma.	Geology
Benton S. Monroe, Ph.D., Assistant Professor of English.	English
Marcel Moraud, Bachelier ès Lettres, Washington, D. C.	French
Guy Brooks Muchmore, B.A., Assistant Professor of Public Speaking.	Public Speaking
Clark Sutherland Northup, Ph.D., Assistant Professor of English.	English
Robert M. Ogden, Ph.D., Professor of Education.	Education
Samuel Peter Orth, Ph.D., Professor of Political Science.	Government
Frederick William Owens, Ph.D., Assistant Professor of Mathematics.	Mathematics
Paul Russel Pope, Ph.D., Professor of German.	German
James T. Quarles, A. A. G. O., University Organist and Assistant Professor of Music.	Music
Harold Lyle Reed, Ph.D., Assistant Professor of Economics.	Economics
Hugh Daniel Reed, Ph.D., Assistant Professor of Zoology.	Zoology
Floyd Karker Richtmyer, Ph.D., Assistant Professor of Physics.	Physics
Arthur John Rider, M.S., Instructor in Chemistry.	Chemistry
Guillermo Rivera, M.A., Instructor in Spanish, Harvard University.	Spanish
Louis A. Roux, B.A., Teacher of French, Newark Academy.	French
Burton T. Scales, M.A., Director of Music, Girard College.	Music
Albert Ray Shadle, M.S., Instructor in Zoology.	Zoology
Francis Robert Sharpe, Ph.D., Assistant Professor of Mathematics.	Mathematics
Luis N. Sherwell, Teacher of Spanish, Stuyvesant High School, New York City.	Spanish
Edith M. Stone, Director of Music in Public Schools, Jackson, Mich.	Music
William Strunk, Jr., Ph.D., Professor of English.	English
Cony Sturgis, B.A., Acting Assistant Professor of Romance Languages.	Spanish
Oscar Diederich von Engeln, Ph.D., Assistant Professor of Physical Geography.	Geography
Harry Porter Weld, Ph.D., Assistant Professor of Psychology.	Psychology
Bernice White, Instructor of Music, Normal College, New York City.	Music
Cornelia Williams, Principal, South Hill School, Ithaca.	Music
James Albert Winans, M.A., Professor of Public Speaking.	Public Speaking
E. Jane Wisenall, Teacher of Music in High Schools, Cincinnati, Ohio.	Music
Harry Elmsley Wood, Director of Manual Training, Indianapolis, Ind.	Industrial Education
Ralph W. G. Wyckoff, B.S., Instructor in Chemistry.	Chemistry
Michael J. Zigler, M.A., Instructor in Psychology.	Psychology
Wesley Daniel Zinnecker, Ph.D., Instructor in German.	German

OBJECT OF THE SUMMER SESSION

The primary object of the Summer Session is to advance education by helping those engaged in it. The instruction is adapted to the needs of the following classes:

1. Professors and teachers in colleges and schools, superintendents, and supervisors of special branches of instruction.

The announcements of the different departments show a wide range of work. This work is either advanced and, therefore, suited for specialists who wish to pursue their individual study, or more elementary and adapted to teachers who desire to start in a new field. In addition to the instruction of the class room, the University's libraries, laboratories, and shops are open for use. For superintendents and supervisors, there are also courses in administration, and in general and special methods, besides lectures on educational philosophy and theory.

2. College students in Cornell or other universities who wish to use some of the "long vacation." In the case of graduates some of the work offered may be counted toward an advanced degree. Undergraduates may anticipate work and thereby shorten their course, or may make up existing deficiencies. The conditions for receiving credit, and the amount which may be obtained, are stated on pages 7 and 8.

3. Students entering the University and wishing to obtain surplus credit at entrance, or to complete the entrance requirements. It often happens that students have in June more or less than the requirements for admission to college. The Summer Session affords them the opportunity either to add to their surplus and thus, in some cases, to gain a year in time; or to make up their deficiency.

4. All persons qualified to pursue with profit any course given, whether or not they are engaged in formal study or teaching.

ADMISSION, ATTENDANCE, REGISTRATION

There is no examination for admission to the Summer Session. For conditions of admission to courses in the College of Agriculture, see page 54. Each person must, however, satisfy the instructor in charge of any course (unless it be elementary) that he is qualified to pursue the work. Any duly registered student of the Summer Session may visit such classes as he desires. **Admission to the class rooms is restricted to duly registered students.** Persons wishing to have work done during the Summer Session counted towards a degree, must conform to the regulations stated under the heading "Credit for Work," page 7.

All students are required to register at the office of the Registrar in Morrill Hall. They may register on Monday, July 8, between 8 a. m. and 5 p. m., or upon the day of their arrival, if they reach Ithaca later than July 8. Registration on July 8 is urged. Class exercises begin at 8 a. m., Tuesday, July 9. The Registrar's office is open from 9 a. m. to 4 p. m. every day except Saturday, when it is closed at noon.

Students who wish credit for graduate work must register also with the Dean of the Graduate School at his office, Room 22, Morrill Hall.

REGISTRATION FEE

A registration fee of \$5 will be charged each student who registers for the first time in the Summer Session. This will be paid only once. Registration in a second year or in subsequent years will be without this fee. Matriculated students are not exempted from paying it on their first registration in the Summer Session. This fee will be collected with the tuition.

TUITION FEE

The single tuition fee, with the exceptions noted below, for the entire Summer Session, whether one course or more is taken, is \$30. This must be paid at the office of the Treasurer, Room 1, Morrill Hall, within five days after registration day. In case of withdrawal within five days from the first registration day, for reasons satisfactory to the Treasurer and the Registrar, the tuition paid may be refunded and the charge cancelled. In case of withdrawal within two weeks after the first registration day, one-half the tuition may be refunded. In case of registration after the first three weeks of the session, students must pay two-thirds of the full tuition fee. No student is admitted without the payment of this fee. Sibley College students taking shopwork are not exempted. Admission to classes is restricted to duly registered students.

For instruction in swimming and fencing an extra fee is charged. See p. 14.

Tuition in all subjects taught in the College of Agriculture is provided by the State of New York, and is free to *students registered therein who are residents of this State*. For all others the charge is the same as for other work, \$30. Free tuition does not include any instruction outside the College of Agriculture, nor are students receiving free tuition permitted to attend classes outside the College of Agriculture.

On payment of \$30 tuition fee a person may take work in both the College of Agriculture and any other department.

LABORATORY FEES

Chemistry. A fee is charged for material actually consumed, and such deposit must be made with the Treasurer as the instructor may prescribe.

Physics. In this department the fee is at the rate of \$1 for every five hours a week of work in the laboratory. The entire amount must be paid to the Treasurer at the beginning of the session.

Geography and Geology. In courses S 2 and S 9 in geography a fee of \$1 each must be paid in advance to the Treasurer to cover incidental expenses of the course.

Shopwork. The fee for shopwork is at the rate of \$1.50 for every fifty hours spent in the shops. This must be paid in advance to the Treasurer. Students registered in Sibley College during the previous year are not required to pay this fee.

Library Deposit. See under Library, page 9.

ACADEMIC CREDIT FOR WORK

In the College of Arts and Sciences. The requirements for the degree of Bachelor of Arts are residence for eight terms (four years), and the completion of one hundred twenty hours ("points") of elective work. A student who has satisfied the entrance requirements of the College, and has afterwards completed in two or more Summer Sessions, at least twelve hours of work in courses approved by the departments concerned, may be regarded as having thus satisfied one term of residence. Under no circumstances shall work done in Summer Sessions be accepted as the equivalent of more than two terms of residence. The maximum amount of credit towards the A.B. degree which is allowed for the work of any one Summer Session is eight hours. In order to receive credit towards the A.B. degree a student must pass at least five hours, and must secure in advance the approval of the Dean for his choice of studies.

In Other Colleges of the University. The nature and amount of credit allowed in these for Summer Session work may be learned from the statements under the announcement of each course.

In the Graduate School. Graduate work at Cornell is not expressed in terms of courses or hours. A graduate of any college whose requirements for a first degree are substantially equivalent to those for the first degree at Cornell may be admitted to resident study in the Graduate School. He may be admitted to candidacy for an advanced degree upon the recommendation of the professors under whom he proposes to work. The conferring of the degree itself does not depend primarily on the completion of any prescribed number of courses or of a fixed term of residence. It involves the writing of a thesis and the passing of a special final examination. The minimum period of residence for the Master's degree is one academic year or its equivalent, and for the Doctor's degree three years.

Not all work done by a graduate student is graduate work in the strict sense of the term. Graduate work to be considered as work for a degree must be of advanced character in some field or department of knowledge. No credit for residence towards a master's degree will be granted any student who does not register with the Dean of the Graduate School within three days after the opening of the Session, and who does not formally become a candidate for this degree under the direction of a special committee. The latest day for such registration in 1918 will be July 11.

The residence requirements for the degree of Master of Arts may be fulfilled in whole or in part by attendance during the Summer Session of the University. For this purpose, two Summer Sessions will be regarded as the equivalent of one term, and four Summer Sessions as the equivalent of one year. Candidates for this degree who are in residence during Summer Sessions only are also required to continue their studies during the year under the direction of the chairman of the special committee in charge of their work.

The graduate work offered in the summer of 1918 may be learned from the departmental announcements. Not all departments offer graduate work.

Any person wishing to become a candidate for an advanced degree and to study during the Summer Session should write to the professor whose work he expects to take, and also to the Dean of the Graduate School, asking for a blank form of application for admission to the Graduate School. It is much better to make these arrangements before coming to Ithaca, thus avoiding delay and interruption of study after the Summer Session has begun.

In order to secure credit for graduate work done in the Summer Session a student must register with the Dean of the Graduate School, Room 22, Morrill Hall, not later than Thursday, July 11.

Certificates for Work Done. Students of the Summer Session who are not matriculated in the University may receive certificates of attendance and of work satisfactorily performed. Application for them must be made before August 16, and the applicant must leave at the office of the Registrar a large-sized envelope stamped and directed to his home address. The certificate will then be forwarded by mail. The regulations of each department for the granting of a certificate must be met.

COST OF LIVING

The cost of board and furnished room in Ithaca during the Summer Session runs from \$8 a week upwards. In some cases the cost has been reduced to \$7, but it is not safe to count upon less than this sum.

The price of a single furnished room may be as low as \$2 a week. The prices advance with the size and location of the rooms.

Rooms are engaged with the understanding that they will be occupied for the entire session, unless otherwise agreed upon by both parties. Table board is usually engaged by the week, or, if so stated, by the day.

A list of desirable rooms in private houses may be had on application after June 1. Students are cautioned against unauthorized rooming house agents.

The price of table board runs from \$5 to \$7 in boarding houses. In cafeterias and restaurants, the average cost of meals amounts to about the same sum.

RESIDENTIAL HALLS—ROOMS—BOARD

1. For Women. The University has three residential halls for women in which board and rooms may be obtained during the Summer Session by registered students only.

Rooms in these buildings will be reserved in the order of application. Each application for a room must be accompanied by a deposit of \$5; otherwise the application will not be entered. If the room assigned is occupied by the applicant the amount of this deposit is held until the end of the session to cover the return of keys, damage to building or furniture other than ordinary wear and tear, and to insure the completion of the lease. The deposit is refunded if the applicant gives formal notice to the manager on or before June 15 that she wishes to withdraw her application.

In Sage College, which accommodates 175, the charge for room, table board, and a specified amount of laundry, will be, for the session, from \$55 to \$67 according to the size and location of the room.

In Prudence Risley Hall, which accommodates 151, the charge will be from \$61 to \$64 according to the room occupied.

In both buildings this charge includes lodging Friday night, July 5 (not earlier), breakfast Saturday, July 6, and all meals to and including breakfast Saturday, August 17.

Members of the Summer Session who do not room in Sage College or Prudence Risley Hall may obtain table board at either. The charge is \$7 per week.

In Cascadilla Hall a furnished room may be had for the six weeks of the Summer Session at a cost of \$15 to \$24. This building is furnished like the others but has shower baths and not tubs. In this building the University maintains a cafeteria restaurant where meals may be had at very reasonable rates.

Rooms and board may be secured in private houses. A list of approved houses may be had by writing the Director of the Summer Session after June 1. It is not safe to engage rooms in places not recommended by the University.

2. For Men. Founders Hall, one of the new group of residence halls, is available for men students.

For room plans and all information relative to these halls, apply to Thomas Tree, Manager of Residential Halls, Sage College, Ithaca, N. Y. Checks for reservation of room, or in payment of board bills, should be drawn to the order of Cornell University.

THE LIBRARIES

The University Library is open on week days from 9 a. m. to 10 p. m., except Saturday, when it is closed at 1 p. m. In this are located the main library, containing about five hundred thousand volumes, and most of the seminary and special libraries. The main reading room affords accommodations for over two hundred readers, and contains a selected library of over 8,000 volumes of reference works. Adjacent to it is the periodical room in which are kept the current numbers of about five hundred journals in various fields of knowledge. These rooms are open to all students. Students properly qualified are allowed the use of the seminary rooms and of the books in them. The main collection is primarily a library of reference for use in the building. Students are, however, to a limited extent, allowed to take out books for home use. Persons wishing this privilege must make a deposit of \$5, which will be refunded upon the return of all books taken out.

The Library of the College of Agriculture, in the basement of the Agronomy building, is open on week days from 9 a. m. to 5 p. m., except Saturday, when it is closed at 1 p. m. In it will be found a large collection of bulletins and reports of experiment stations, reference books on agriculture and country life, agricultural periodicals, and the like. The entomological library, in the Department of Entomology on the fourth floor of the main building, is one of the most complete of its kind in the United States. Nearly all the departments in which instruction is given have well-selected departmental libraries.

LECTURES, MUSICAL RECITALS, EXCURSIONS

In addition to the regular class room work there will be public lectures on Monday evenings.

There are also lectures of general interest each week in connection with the various departments. Notice of these will be given in the University Calendar.

Musical recitals will be given on Tuesday evenings in the Sage Chapel and on Sunday evenings July 14 and August 11 in Bailey Hall, and piano recitals on Wednesday in Barnes Hall.

Wednesday evenings are devoted to the departmental conferences which are open to all interested. Notice of these will be given from week to week.

In connection with the work of several departments excursions are made to many points of interest. Some of these are open to members of the Summer Session. Notable for their attraction are the excursions to Watkins Glen and to Niagara Falls.

RAILROAD ROUTES AND RATES

Ithaca is reached by either the Lehigh Valley or the Lackawanna railroad. By the latter, a branch leaves the main line at Owego. Through trains run from New York and Buffalo on the Lehigh, and through sleeping cars run daily from New York on both roads. From Philadelphia, and from Baltimore, Washington, and the South via the Baltimore & Ohio, the Philadelphia & Reading connects with the Lehigh at Bethlehem. On the Lehigh, through trains for Ithaca connect with the New York Central at Auburn, and with the Pennsylvania (Northern Central) and the Erie at Elmira.

From some important points in the Middle and Atlantic States summer excursion tickets may be purchased to Ithaca. From central and western states it may be possible to buy excursion tickets to Niagara Falls, in case an excursion rate to Ithaca is not available.

Persons interested should, some time in advance of their departure, make inquiry of the railroad agent at their home town. If full information cannot be obtained in this way, write to the Director of the Summer Session, Ithaca, New York.

COURSES OF INSTRUCTION

Most of the courses offered consist of five exercises a week, each week day except Saturday. The number of actual hours of class work in any course may be found by multiplying the number of weekly exercises by six.

The word "hour" used in speaking of University credit means the equivalent of one class exercise a week for a half year or one semester. One hundred and twenty such "hours" are required of candidates for the A.B. degree.

(G. S. = Goldwin Smith Hall.)

EDUCATION

Courses S 1, S 2, and S 3, will be found especially helpful to college graduates who are preparing for examinations in professional subjects as outlined in the New York State Syllabus and Course of Study for the renewal of the College Graduate Certificate Limited. The State Education Department will hold an official examination for such candidates at Ithaca, August 15 and 16. Since it is permissible to do so, those who can should prepare for examination in two subjects this summer and for the remaining two a year later.

S 1. Educational Psychology. Professor OGDEN. Daily except Sat., 11. G. S. 256. Credit, two hours.

A study of the learning process and its application to educational theory and practice: the original nature of man, reflex action and instinct; the acquisition of habits; attention, memory, association and thinking; fatigue, individual differences and social cooperation. The text-book used in this course will be Gordon's Educational Psychology.

S 2. Principles of Education. Professor OGDEN. Daily except Sat., 9. G. S. 256. Credit, two hours.

The nature and significance of education; biological and psychological foundations; the school as a social institution; educational ideals and values; the curriculum, administration and general methods. The text-book used in this course will be Ruediger's Principles of Education.

S 3. History of Education. Lectures, recitations, and prescribed readings. Mr. HOISINGTON. Daily, except Sat., 10. G. S. 256. Credit, two hours.

The purpose of this course is to give an understanding of present educational values and practices through an historical consideration of their origin and development. Throughout the course, therefore, attempt will be made not only to outline the problems and their solutions, but to correlate education with the life and the social, psychological, and economic conditions of the times. Only such theories and practices as later proved themselves influential will be considered.

The topics treated are to a great extent those emphasized in the syllabus for the New York State Teacher's Certificate: education in primitive and barbaric societies; Greek and Roman education; the rise of the school as an institution; scholasticism, humanism, and realism; the rise of science; the 'psychological' movement; the origin and nature of specifically modern tendencies in education.

Text-book: Graves' Student's History of Education.

S 7. Mental Tests. Lectures, readings, and laboratory. Mr. HOISINGTON. Lectures, M W F, 12; G. S. 256, Laboratory, T Th, 2-4:30. Credit, two hours.

A general consideration of the psychology and the practice of mental tests. The lectures will deal with the historical development of tests, the principles underlying their formation and application; the single tests and the test-systems; the bearing of tests upon the problems of psychological theory (nature and distribution of intelligence, the correlation of abilities, etc.); the use of tests in the schools, and for the diagnosis of insanity, defective and exceptional abilities, the selection of vocation, educational measurement, and the like.

The laboratory work is intended to give practice in the administering of tests both to individuals and to groups. All the principal single tests as well as the recognized series tests will be used. The results of the laboratory testing will serve as the basis for a part of the lecture course.

Text-book: Terman's *The Measurement of Intelligence*.

TRAINING COURSE FOR PSYCHOLOGICAL EXAMINERS

The demand for psychologists trained to administer mental tests has become urgent. The Government, through its organization of a psychological corps to examine and pass upon the mental fitness of every recruit in the National Army, is drawing into its service trained men from the psychological laboratories of the country. It is necessary to supply their places in the institutions, and to furnish additional men who are willing to be inducted into this branch of the National Service.

The demand for examiners in the educational field is also urgent. By recent legislative enactment of the State of New York special classes for defective children must be formed whenever ten or more such cases are detected in any school district. A similar law is operative in the State of New Jersey, and requirements of the same sort are being made throughout the country. Accordingly, the psychological examination of pupils becomes one of the functions of the school. In coöperation with the medical authorities, teachers may be called upon to determine the mental status of children, and to distinguish between simple retardation and positive physical and psychotic defects.

To assist in meeting these various needs, the Departments of Education and Psychology call special attention to courses in Introductory, Experimental and Educational Psychology, and to the course in Mental Tests. The latter has been expanded to give a thorough training in administration of tests and evaluation of results. Students who wish to enter this course with a view to governmental or educational field service, are advised to register for such additional courses in Psychology as may be helpful in providing an adequate understanding of psychological principles and methods of investigation. Advice in the selection of courses with regard to the individual needs of the student may be had by consulting Professor R. M. Ogden, Goldwin Smith Hall 246, either in person or by letter.

PHYSICAL EDUCATION AND PHYSICAL TRAINING FOR WOMEN

Physical Examinations and Personal Conferences. A physical examination is offered every woman student entering the Summer Session for the first time. Individual appointments will be made for consultation and examination at the

office of the Medical Adviser of Women in Sage College. Consultations are open to all women registered in the Summer Session. Doctors MATZKE and GORDON.

The following courses of lectures are open to all students so far as their time and strength permit.

S 1. Personal and School Hygiene and School Inspection. A course of lectures treating of the right use and proper care of the human mechanism; health habits; the sense organs; the nervous system; the contributing causes of poor health, a consideration of health and sanitary inspection of the class room; inspection for signs of abnormality and injury or illness; considerations which call for immediate attention on the part of the teacher; the detection of defective sight or hearing.

Daily, except Saturday, Stimson Hall, Dr. MATZKE.

S 2. First Aid and Home Nursing. The lectures will follow the plan of the American Red Cross Society.

Daily, except Saturday, Stimson Hall, Dr. MATZKE.

S 3. Gymnastics: School-Room and Playground.

Practical work in free-hand exercises and light-apparatus, the arrangement of material, classification of pupils, methods of teaching and commanding, progression. Daily except Saturday, hours to be arranged. Sage Gymnasium. Credit, one hour.

S 4. Organization and Administration of Playgrounds.

Graded selection and classification of games. Daily except Saturday, hours to be arranged. Sage Gymnasium. Credit, one hour.

S 5. The Teaching of Rhythm, Singing Games, Elementary Folk and Aesthetic Dancing.

For students taking this course for the first time. The first two or three weeks will be devoted to the Rhythms, Singing Games and Folk-Dances; the last few weeks to Elementary Aesthetic Dancing. Daily, except Saturday. Credit, one hour.

S 6. Advanced Course in Rhythm, Singing Games, Folk-Dancing, and Aesthetic Dancing.

Entirely different material from Course S5. The first three weeks will be devoted to new singing games and folk-dances; the last three weeks to advanced aesthetic dancing. Daily except Saturday. Credit, one hour.

If any special class, not offered here, is desired it may be arranged by consulting the department.

Students taking any of these courses should provide themselves with suitable costume—gymnasium shoes and bloomer-suits, or bloomers and middy-blouse, with black stockings.

Appointments will also be made for those desiring any corrective work, either for individual help, or for using the work as teachers.

S 7. Swimming and Fencing.

Instruction in swimming and life saving; and in fencing for individual training and for teaching will be given at hours to be arranged for each applicant by appointment.

For this instruction a special charge is made: for swimming, \$10; for fencing, \$5, including outfit.

Gymnasium costume and slippers (without heels) will be advisable for fencing.

For women, Sage College Gymnasium. 10-12 a. m. 3-6 p. m. For men, Armory Gymnasium, by appointment. Mr. GELAS.

MANUAL TRAINING, DRAWING, DESIGN

Equipment. The shops and drawing rooms of Sibley College are among the largest and best equipped in the country. They are being used regularly by 1200 students and can accommodate 1500. They are at the disposal of the students of the Summer Session, who have the further advantage of seeing the regular instruction given to Sibley College students. They include a machine shop, a foundry, a blacksmith shop, a woodworking shop, and many drawing rooms, lecture rooms, etc. The shops are exceptionally well supplied with machines and tools for complete instruction in the various subjects.

A portion of the equipment has been rearranged and adapted for the special needs of teachers of manual training, drawing, and arts and crafts.

The shops and drawing rooms are open daily (until noon on Saturday).

S 1. Manual Training for the Lower Grades. A course of handwork adapted to the first six years of the elementary school. No set course of study in handwork suitable for this grade will be given, but instead the various materials, suitable for elementary handwork will be made use of and the various methods by which problems can be made will be discussed, demonstrated, and used. This will enable those taking the course to have a large variety of experiences and will equip them with such first-hand information as will make them well fitted to select the type of work best suited to the special communities in which they work. In the lessons on stenciling, for example, instead of giving a problem in stenciling of the general type, there will be discussions, demonstrations and practice in stenciling by the direct method, by the indirect method; with water dyes, with spirit dyes, with water colors, with oil paints, and with crayons; by brush method, by spray method; on paper, textiles, and wall surfaces. There also will be given an opportunity to carry out a definite problem with the processes and material best suited to the individual's needs. Work in stick printing, block printing, construction in paper and cardboard, weaving, reed and raffia work, book binding, blue printing and Vandyke printing, thin wood work, and chair caning will be handled in a similar manner in order that it may meet the particular needs of the regular grade teacher, be of help to the special teacher of art and manual training who wishes to become familiar with the problem of handwork in the elementary grades, or of aid to the craft worker who wishes to broaden his experience. Daily except Sat., 2-4. Mr. WOOD.

S 2. Wood Work for Pre-vocational and Junior High Schools. This is a course employing a comprehensive set of bench tools adapted to the upper grades of the grammar schools. Each model is considered with reference to form, fitness, and decoration. Methods of presentation and execution. This course is intended to equip a capable but inexperienced person for a position as teacher. Daily, 8-11. Mr. HOOPER.

S 3. Wood Working for Secondary Schools. A course which aims to prepare for the teaching of wood work in the secondary schools. It includes the study of joinery, furniture, making structural design, and decoration. Concrete problems involving the principles of the work will be suggested by the teacher and carried out by the class. The individual will have considerable latitude in the choice of the particular project and in its design and decoration. Particular attention will be paid to design. Daily except Sat., 2-5. Mr. HOOPER.

S 5. Shop Lectures and Conferences. Lectures and conferences on the organization and supervision of manual training, methods of teaching, materials, equipment, costs, and courses of study; also practical talks and demonstrations on subjects of importance to the manual training teacher, such as class organization, woods and wood construction, lumber and forestry, wood finishing, factory classes, war work, etc.

This course will give the person preparing to teach manual training a wide vision of the field, with emphasis on organization, the thing so necessary to successful work.

T Th, 4-5. Mr. WOOD.

S 6. Foundry Work for Secondary and Trade Schools. The course begins with instruction in tempering the sand and making green sand moulds for small work. Following this comes exercises in core making, and an explanation of loam work. Machine, floor, and sweep mouldings are briefly described. Castings are made in cast iron, and the students are taught to operate the cupola furnace.

This course will not be given unless a sufficient number apply to Professor A. E. Wells on or before July 7.

S 7. Forging for Secondary and Trade Schools. Systematic instruction in the use of each tool as it is taken up, the study of each material worked, with an explanation of its various grades, the proper method of treatment for each, and the discussion of the methods of making large forgings. The ground covered includes instruction in the building and care of fires, heating, drawing, forming, bending and twisting, upsetting, upsetting while bending, upsetting for square corners, punching, bolt making, welding, including careful instruction in scarfing for the various welds, the making and use of heading tools, chain making, the making and fitting of braces, the construction of hooks and ring bolts, riveting, and the use of threading tools. Training is also given in the use of the power hammer. The work in steel includes drawing, forming, welding, and tempering, and spring and tool making.

This course will not be given unless a sufficient number apply to Professor A. E. Wells on or before July 7.

S 8. Machine Work for Secondary and Trade Schools. The different measuring tools and devices, with the advantages, methods of use, and limits of accuracy of each are considered. Each cutting tool is taken up, its cutting angles and general adjustments are discussed, together with the feeds and cutting speeds suitable for each material worked and for each machine. The course includes instruction in centering, squaring, straight and taper, turning and fitting, outside and inside screw cutting, chucking, reaming, finishing and polishing, drilling, tapping, mandrel making, grinding and lapping, boring, brass turning and finish-

ing, ornamental turning, planing flat and V surfaces, fitting, the use of the milling machine, gear cutting, tool making, including taps, drills, reamers, milling cutters, and cylindrical gauges. Mr. WELLS and Mr. ———.

S 9. Freehand Drawing for Elementary and Secondary Schools. A course to meet the needs of the public school teacher. A complete course of study, in detail, from the first grade through high school is first considered. Then each subject of that course is carefully developed and worked out. This will include methods of drawing in such phases of the subject as the teacher must meet and in the common mediums such as pencil, water color, crayon, and charcoal. Theory and practice will be closely correlated. The study of design and color, perspective, and the pose, for their public school value, combined with talks on methods of presenting these subjects receive thorough attention. Sketching from nature, including out-of-door work for characteristic growth of trees, forms a part of the course. The relation of art to hand work is considered and the study of design is made applicable to constructive problems. Daily except Sat., 9-12. University credit, two hours. Sibley 208. Mr. GRIFFITH.

Although the above course forms a complete unit in itself, the following course is designed as supplementary.

S 10. Design, Fine and Applied Art. (Open only to students who have completed course S9 or its equivalent.) Design is considered from a more advanced point of view and applied to color problems, book plates, title pages, constructive problems, printing, and the like. Stenciling and block printing on velvets and other textiles together with the introduction of interwoven silk on these textiles will be taught; also leather tooling and coloring of leather. Advanced out-of-door sketching will supplement that started in course S 9. Manuscript printing, done direct with quill or lettering pen together with illumination will be considered as outgrowths of the study of printing. Costume design and household decoration, as far as they are applicable to the grammar or the high school, will be considered in their application. Throughout the course illustrated lectures to develop art appreciation will be given. All subjects will be considered from the standpoint of both the secondary and the more advanced schools. A small laboratory fee (not to exceed one or two dollars) will be charged, to cover cost of material furnished. Daily except Sat., 8-11. Sibley 202. University credit, two hours. Mr. GRIFFITH.

Students who have completed courses S 9 and S 10 may continue their study, if so desired.

S 11. Mechanical Drawing for Secondary Schools. This course is designed for those who wish to teach mechanical drawing in secondary schools and for those who feel the need of a more complete knowledge of this subject to assist them in teaching shop work. Some of the topics covered are use of instruments, lettering, orthographic and isometric projection, inking, tracing, conventions, and working drawings. Students familiar with these topics may elect a more advanced course. Sibley 102. Assistant Professor ———.

PSYCHOLOGY

S 1. Introduction to Psychology. Goldwin Smith, Room C. Credit, two hours. Lectures: Daily except Sat., 9. Asst. Professor WELD and Mr. ZIGLER.

This course furnishes a general introduction to the study of the normal human mind from the experimental point of view. It opens with a brief discussion of the nature of a "scientific" psychology, of the problems which such a psychology is called upon to face, and of the methods at its disposal for their solution. It then sets forth in order the facts and laws of mental life as indicated by experiment, beginning with sensation, image, and affection; it passes by way of attention, perception, association, and memory to the highly complex processes of imagination, voluntary action, and thought. Throughout the work use will be made of the unique collection of demonstrational apparatus which composes the equipment of a special laboratory in Goldwin Smith Hall. The beginning student is thus enabled to confirm in his own experience the statements made in the textbook and in the lectures.

Readings will be prescribed in Titchener's *Beginner's Psychology*. Supplementary readings in Titchener's *Textbook of Psychology* will be recommended to members of the class who desire to pursue more intensive study.

S 2. Physiological Psychology. Goldwin Smith, Room C. Credit, one hour. T Th, 11. Asst. Professor WELD.

A course of lectures with supplementary readings. Emphasis will be laid upon the nervous system not only as a correlate of mental experience, but also as the basis of functional psychology. No knowledge of physiology or psychology is presupposed. The course will include such topics as the following: the point of view of physiological psychology and its relation to experimental psychology and to behavior, the nature of the nervous system and current theories of its function, the nervous correlates of sensation, preception and idea, association and memory, instinct and habit, action, emotion, and mental hygiene. No textbook will be used. Readings will, however, be assigned in standard texts to be found in the library.

S 4. Introductory Laboratory. Psychological Laboratory, Morrill Hall. Credit, two hours. M W F, 2.00-4.30. Asst. Professor WELD, Mr. ZIGLER, and Dr. GLEASON.

The purpose of this course is to furnish the student training in psychological method, and to give him a first-hand acquaintance with the contents of his own mind. The laboratory consists of twenty-seven rooms on the upper floors of Morrill Hall, including dark rooms, workshops, and offices. The equipment on the side of apparatus is especially complete, embracing besides the standard pieces for qualitative experiments a great variety of special instruments. The equipment of the research laboratory is also available for demonstrations. Experiments will be performed in vision, audition, and the other departments of sense, in feeling, attention, perception, and idea, and toward the end of the work the student may carry out experiments upon the more complex processes of association and action. The textbook is Titchener's *Experimental Psychology*, vol. i, *Qualitative Student's Manual*.

S 5. Quantitative Laboratory. Psychological Laboratory, Morrill Hall. Credit, two hours. M W F, 2.00-4.30. Asst. Professor WELD, Mr. ZIGLER, and Dr. GLEASON.

This course aims to furnish such training in the psychophysical methods and in the handling of instruments of precision as will be adequate preparation for

research problems. The student will make experimental determinations of the stimulus limens, will attempt verifications of Weber's Law in various departments of sense, and will perform at least one experiment by each one of the chief psychophysical methods. Quantitative experiments in special fields may be undertaken in so far as time permits. The text-book is Titchener's *Experimental Psychology*, vol. ii, *Quantitative Student's Manual*.

Laboratory partnerships must be formed if the work of this course is to be pursued with profit. If, therefore, a partner cannot be found, the student is recommended to register in course S 6.

S 6. Advanced Work in Psychology. Psychological Laboratory, Morrill Hall. Hours and credit to be arranged. Asst. Professor WELD and Mr. ZIGLER.

As a prerequisite for this course, Course S 4, or its equivalent, is necessary. The work may consist either of essays and reports upon some special topic, or of laboratory practice at a higher level than that of course S 4.

PHILOSOPHY

The courses in philosophy are intended to be of general, rather than of technical interest, and may be taken by all students. Candidates for the degree of Master of Arts who have chosen philosophy as a major or minor subject will find it profitable to take at least some of these courses as a basis and preparation for more advanced study. Such students will be given personal guidance in regard to their reading.

S 1. The Development of Modern Philosophical Thought. Daily except Sat., 8. G. S. 225. Professor CREIGHTON.

This is a course in the history of modern philosophy, covering the same ground as that given during the second term of the regular year. It will, however, be somewhat less technical than that course, and will emphasize the connection of philosophy during the modern period with literary, scientific, political, and social movements.

S 2. Contemporary French Philosophical Thought. M W F, 12. G. S. 225. Professor CREIGHTON.

The lectures of this course will give some account of the fundamental ideas underlying the main intellectual movements in France during the nineteenth century. A study of Bergson's *Introduction to Philosophy*, and of his *Creative Evolution*, will form the center of the class-work.

S 3. Philosophical Results and Applications. T Th, 12. G. S. 225. Professor CREIGHTON.

The purpose of this course is to show how philosophical ideas enter into and have an influence upon other departments of thought, and thus are closely connected with the most concrete and practical problems of life and society. This will be illustrated with reference to certain fundamental, ethical, political, and educational problems of the present day.

ENGLISH

Courses S 1 and S 2 taken together will be considered the equivalent of the first term of course 1 or of course 3 in the regular University session. Courses S 1 and S 3 taken together will be considered the equivalent of the second term of course 1 or of course 3. But courses S 1, S 2, and S 3 taken together will not be considered the equivalent of both terms of course 1 or of course 3.

S 1. Composition. Daily except Sat., 8. G. S. 156. Credit, two hours. Mr. BUNDY.

A practical drill intended for those who lack proficiency in writing; discussion of the elements and forms of discourse; frequent exercises, mainly expository; weekly personal conferences at hours to be appointed.

S 2. Introductory Course in Literature. Daily except Sat., 9. G. S. 164. Credit, two hours. Mr. BUNDY.

Primarily a study of five of the Idylls of the King, the Coming of Arthur, Lancelot and Elaine, the Holy Grail, Guinevere, and the Passing of Arthur; and of the first, fifth, sixth, and seventh books of the Ring and the Book; and supplementary reading in Tennyson and Browning.

S 3. Shakespeare. Daily except Sat., 10. G. S. 156. Credit, two hours. Dr. GILBERT.

The first two weeks of this course will be given to detailed examination of one or two of the important plays; scenes will be assigned to individual members of the class for special study and report. The remainder of the time will be given to rapid reading of as many dramas as possible. Othello, King Lear, Cymbeline, Much Ado About Nothing, The Tempest, and Henry IV will be among those considered, though the choice will depend somewhat on the previous studies of the class. A few written essays or reports will be required. The course will have as its end the understanding and appreciation of the plays as works of dramatic art, and problems of language and history will be considered only incidentally.

S 4. Advanced Composition. Daily except Sat., 11. G. S. 164. Credit, two hours. Dr. GILBERT.

Intended for those who have attained some proficiency in writing and who desire criticism and suggestion. As far as possible, the work of the class will be arranged to suit the needs of its individual members, and consideration will be given to those looking forward to the professional use of writing. Special attention will be paid to familiar essays and short stories. Personal conferences at hours to be appointed. The course is open to any who have completed course S 1 or its equivalent. Those desiring to register are requested to mail a specimen of their composition to the instructor (address: 202 Miller St., Ithaca, N. Y.) before July 1.

S 5. Teachers' Course. Daily except Sat., 9. G. S. 156. Credit, two hours. Assistant Professor NORTHUP.

Lectures, readings, reports, and discussions. Designed for those who are teaching or expect to teach English in schools. Organizations of the high school course in English; methods of treating the works named by the Conference

on Uniform Entrance Requirements in English; the best editions of these works; supplementary reading for pupils and teacher; the use of the school library and the public library; stage productions; the place of grammar in the high school; problems of oral and written composition; the relation of composition to literature and to other subjects in the curriculum.

S 6. Victorian Literature. Daily except Sat., 12. G. S. 164. Credit, two hours. Assistant Professor NORTHUP.

Lectures, readings, reports, and discussions of the leading characteristics and tendencies of the nineteenth century; the Romantic movement; the literary reflection of social changes; the relation of science and politics to literature; the development of the various types of literature; illustrative readings in the works of Tennyson, Browning, Arnold, Swinburne, Rossetti, Dickens, and Thackeray, with a glance at some other writers.

This course does not cover the ground of course S 2.

S 7. Nineteenth Century Poetry. Daily except Sat., 8. G. S. 164. Credit, two hours. Assistant Professor BROUGHTON.

A study and discussion of the most important poems of Wordsworth, Coleridge, and others; brief survey of the literary and historical background of the period; significant revolutions in thought, in literary criticism, and in the art of poetry.

S 8. Nineteenth Century Prose. Daily except Sat., 9. G. S. 160. Credit, two hours. Assistant Professor MONROE.

A study of some significant examples of modern prose, drawn chiefly from Macaulay, Carlyle, Lamb, and DeQuincey. There will be some discussion of prose style and of the essay as a literary type.

S 9. American Literature. Daily except Sat., 12. G. S. 156. Credit, two hours. Assistant Professor BROUGHTON.

A study of the American poets of the nineteenth century with particular attention to Bryant, Poe, Whittier, Longfellow, Lowell, Holmes, and Emerson. Text: Page's Chief American Poets.

S 10. The English Language. Daily except Sat., 8. G. S. 162. Credit, two hours. Assistant Professor MONROE.

A study of essential features in the growth and development of the mother-tongue. Among the topics considered are: language and grammar in general; some misconceptions about the life of language; the relationships of English; phonetics, with practical exercises; the English vocabulary; inflections; native resources and foreign influences; modern English grammar; syntax; disputed usages; the bearing of historical grammar on present forms and usages, spoken and written.

Recitations, lectures, collateral reading. The course does not require previous knowledge of Old or Middle English.

S 11. Modern Drama. Daily, except Sat., 10. G. S. 160. Credit, two hours. Professor STRUNK.

An advanced course designed for those who have completed two or more college courses in English, or whose reading serves as an equivalent for freshman and sophomore work.

Reading and discussion of characteristic plays of some of the more important, recent dramatists—Ibsen, Strindberg, Brieux, Tchekov, Shaw, Galsworthy and others; consideration of the modern theatre; current theories of drama.

Texts: Ibsen, *Doll's House*, etc. (Everyman's Library, No. 494); Dickinson, *Chief Contemporary Dramatists*; Shaw, *John Bull's Other Island* and *Major Barbara*.

S 12. Recent English Poetry. Daily except Sat., 11. G. S. 160. Credit, two hours. Professor STRUNK.

A study of the poetical work of Robert Bridges (the classical tradition of English poetry), Rudyard Kipling (the romance of the modern world; imperialism), and W. B. Yeats (neo-romanticism; the Celtic revival); readings from other contemporary work, including the "new poetry" and the poetry of the War.

Texts: Robert Bridges, *Poetical Works* (one volume, Oxford edition); Kipling, *Collected Verse*; Yeats, *Poetical Works*, vol. i.

S 13. Old English. Daily except Sat., 11. G. S. 167. Credit, two hours. Assistant Professor MONROE.

This course is intended for students who, lacking the opportunity hitherto, now wish by earnest effort to acquire some knowledge of English in its early form. Lessons in grammar are followed as soon as possible by the reading of easy prose of the time of Alfred the Great.

The course may be taken by undergraduates; and, with additional reading, by graduates as a part of their work for the master's degree.

PUBLIC SPEAKING—ORAL ENGLISH

In the courses described below, individual instruction will be given by appointment. In this way the particular needs of each student, however varied they may be, can be met. No fees will be charged for this special instruction.

S 1. Public Speaking. Daily except Sat., 8. G. S. 21. Credit, two hours. Professor WINANS.

A practical training for speaking in public. Original speeches and selections; extemporaneous speeches. Methods of preparing will be discussed and illustrated. High school teachers will find the methods applicable to their work. Regular students passing this course will be admitted to the work of the second term in Public Speaking, course 1.

S 2. Voice Training. Daily except Sat., 9. G. S. 21. Credit, one hour. Special work may be arranged with the instructor for one hour additional credit. Assistant Professor MUCHMORE.

This course consists of exercises for the development of pure tone, flexibility, melody and strength of voice, clear enunciation, and for relief from high, strained tones, harshness, throatiness, and speakers' sore-throat. Private appointments will be given each student, in which the voice will be tested, and, if needed, special exercises prescribed. The course necessarily includes training for poise and ease of action. The relation of the voice in conversation, teaching, and public speaking to health is emphasized.

S 3. Oral English for Teachers. M W F, 10. G. S. 21. Credit, one hour. Consent of instructor necessary for admission. Professor WINANS.

Discussions by instructor and class of the work of high school courses, their content, order of work, methods of teaching, programs and exercises, textbooks and articles on the subject. Attention will be given to the New York Syllabus for Secondary Schools. With this course should be taken other courses in this department, particularly S 1.

S 4. Oral Reading. Daily except Sat., 11. G. S. 21. Credit, two hours. Assistant Professor MUCHMORE.

This course is designed especially to help teachers of literature, but is open to all students. The first part of the course will be devoted to the elements of reading: attention, individualization, and sequence of ideas. The second part will be given to the oral interpretation of literature, with special emphasis on the spirit rather than the form. Each member of the class will receive private appointments, and will prepare individually at least one selection. Regular students who pass this course will be admitted to the second term in Oral Reading, course 10.

[The Production of School Plays. M W F, 9. G. S. 26. Credit, one hour. Consent of instructor necessary for admission.

The course is intended to give teachers sufficient knowledge of play-production to meet the growing demand in the schools for dramatics that have an educational value. There will be consideration of choice of plays, elements of training, staging of plays, and other practical phases of production. Reading of plays to insure sufficient familiarity with suitable dramatic literature will be required. One act plays will be rehearsed.] Not given in 1918.

FRENCH

Courses S 1, S 2, S 3, afford the student an opportunity of gaining a working knowledge of French and also a chance to make a rapid review of the subject. The other courses are intended for teachers and graduate students. The members of the Department will be very glad to supervise the work of graduate students in any special field of investigation.

S 1. First Year French. Grammar, reading, composition, and oral training. Daily except Sat., 8 and 12. G. S. 290. Mr. ROUX. University credit, four hours. Entrance credit, one unit.

The object of this course is two-fold: first, to give beginners a thorough drill in the essentials of French pronunciation, grammar, and reading; second, to offer to teachers an opportunity to study the methods of presentation of these subjects to beginners. By supplementary reading after the Summer Session students may prepare themselves for the fall examinations in Second Year French.

S 2. Second Year French. Grammar review and reading. Daily except Sat., 8 and 12. G. S. 281. Mr. MORAUD.

University credit, four hours. Entrance credit, one unit.

S 3. Third Year French. Daily except Sat., 8 and 12. G. S. 277. Mr. BUTTERY.

University credit, four hours. Entrance credit, one unit.

S 4. Elementary Composition and Conversation. Daily except Sat., 10. G. S. 281. Mr. BUTTERY. Credit, two hours.

S 5. Advanced Composition and Conversation. Daily except Sat., 8. G. S. 283. Professor MASON. Credit, two hours.

This course is conducted in French.

S 6. Contemporary French Literature. Daily except Sat., 11. G. S. 283. Professor MASON. Credit, two hours.

Lectures on the contemporary novel, drama, and poetry. Assigned reading and reports.

[**Old French Texts.** This course is given in alternate years.] Not given in 1918.

S 7. Teachers' Course. Daily except Sat., 10. G. S. 290. Mr. Roux.

A course for the discussion of the problems connected with the teaching of French in the secondary school. The question of method in general, of the proper functions of oral and of written work, of translation, of grammatical drill, etc., and individual problems of teaching presented by members of the class will be taken up and discussed.

S 8. French Phonetics. Daily except Sat., 9. G. S. 283. Professor MASON. Credit, two hours.

A practical study of French pronunciation. Considerable attention is given to phonetic transcription and to the use of phonetics in the teaching of French. This course is recommended to students taking course S 4 or S 5.

S 9. Military French. Daily except Sat., 10. G. S. 281. Mr. MORAUD. Credit, two hours.

Conversation and the study of French military terms. This course is given with special reference to students who intend to enter national service.

History of France under the Third Republic. See page 29.

France and the French of Today. See page 29.

France and the United States. See page 29.

French Philosophy. See page 18.

French Conversation. In order to afford additional opportunity for the use of French, special reservation of one wing, or as much as may be needed, of Prudence Risley Hall, will be made for teachers, actual or prospective, of French, and a special table, at which French only will be spoken, will be maintained in the dining room of the same building. A competent and skilled teacher of French will preside at this table, and will organize other ways of a recreative kind for the use of French in the daily life of the students.

SPANISH

S 1. First Year Spanish. Grammar, pronunciation, composition, translation. Hills and Ford, First Spanish Course. Daily except Sat., 8 and 12. G. S. 227. Mr. KENNEL. University credit, four hours. Entrance credit, one unit.

The object of this course is to afford those who have had no Spanish an opportunity to acquire the essentials of the grammar, to lay the foundations for the spoken and written use of the language, and to learn to translate easy Spanish.

S 2. Second Year Spanish. Grammar review, translation, composition, conversation. Daily except Sat., 8 and 12. G. S. 242. University credit, four hours. Entrance credit, one unit. Mr. SHERWELL.

S 3. Third Year Spanish. Composition, translation, and reading of modern authors. Daily except Sat., 8 and 12. G. S. 124. Mr. RIVERA. University credit, four hours. Entrance credit, one unit.

Open also to those who have had one year of college Spanish. Especial emphasis will be laid on modern Spanish idioms and on the accurate rendition of prose and verse into English.

S 4. Advanced Translation. Translation of selected works of the best known Spanish authors. Daily except Sat., 12. G. S. 134. Acting Assistant Professor STURGIS. University credit, two hours.

Intended primarily for teachers.

S 5. Elementary Spanish Composition and Conversation. Daily except Sat., 11. G. S. 242. University credit, two hours.

Intended for students who have had at least two years of preparatory school Spanish or one year of college Spanish and who desire special practice in the written and oral use of the language. It may be profitably taken in connection with Course S 3.

S 6. Advanced Spanish Composition and Conversation. Daily except Sat., 11. G. S. 134. Acting Assistant Professor STURGIS. University credit, two hours.

Intended for students who have had one course in general composition and wish to go on to the more difficult written and oral usage.

S 7. Spanish Commercial Correspondence. Daily except Sat., 9. G. S. 124. Mr. RIVERA. University credit, two hours.

For students who have had experience in Spanish composition. Special emphasis will be laid on the forms of business letters, advertisement and circular writing, and the drawing up of commercial papers.

S 8. Spanish-American History. Daily except Sat., 10. G. S. 134. Acting Assistant Professor STURGIS. University credit, two hours.

Lectures, translation, outside reading, and reports. This course is intended to give the student a background for the better comprehension of Spanish and the Spanish speaking people in the American continents.

Courses S 5, S 6, S 7, and S 8 will be conducted in Spanish. Spanish will be the medium in other classes as far as feasible.

Frequent talks and lectures in Spanish on subjects of Hispanic interest will be given during the session by members of the department.

Spanish Conversation. In order to afford additional opportunity for the use of Spanish, special reservation of one wing, or as much as may be needed, of Prudence Risley Hall, will be made for teachers, actual or prospective, of Spanish, and a special table, at which Spanish only will be spoken, will be maintained in the dining room of the same building. A competent and skilled teacher of Spanish will preside at this table, and will organize other ways of a recreative kind for the use of Spanish in the daily life of the students.

GERMAN

Courses S 1, S 2, S 3, afford the earnest worker an opportunity to gain a working knowledge of German by highly concentrated effort, and a chance to make a rapid review of previous reading.

The other courses are intended for teachers and for students of considerable proficiency in the subject. They present opportunity for advanced study in language, grammar, and literature, and also are intended to give direct practical assistance in the various problems which confront the teacher. Students are urged and encouraged in every possible way to use German in and out of the class room.

S 1. First Year German. Oral training, grammar, composition, reading. Daily except Sat., 8 and 12. G. S. 183. Professor POPE. University credit, four hours. Entrance credit, one unit.

This course affords an opportunity for those who have had no German to acquire a practical working vocabulary, to master the essentials of grammar, to learn to read easy German, and to begin conversational work in the language. As far as possible the language of the class room will be German. Two recitations will be held daily except Saturday with sufficient time between the two for the preparation of the second lesson. Textbook: Zinnecker's *Deutsch für Anfänger*. After successfully completing this course, students can, by supplementary reading during the summer, prepare themselves for the fall entrance examination in second year German, or they may take the second year German course during the first term of the regular college year. Dr. POPE will be in Room 182, T Th, 9, to give special assistance to members of this class.

This course also affords teachers of German an opportunity for observation of methods of teaching.

S 2. Second Year German. Oral and written use of the language based on the reading of German texts. Review of important topics of grammar in connection with the reading. Two recitations will be held daily except Saturday with sufficient time between the two for the preparation of the second lesson. Textbooks: Zinnecker's *Deutsch für Anfänger*; Roessler's *A First German Reader*.

Prerequisite: one year of high school German or its equivalent. Those who do not present certificates showing the completion of one year's work in German will be required to take a test at the beginning of the course. This course is equivalent to the second year of high school German and its completion entitles the student to a second unit of entrance credit in German. University credit, four hours. Daily except Sat., 8 and 12. G. S. 190. The instructor will be in room 178, T Th, 9, to afford special assistance to members of this course.

This course will be given only in case six or more students shall register for it with the Director of the Summer Session not later than June 25. Those who apply before that date will be informed then whether the course will be given.

S 3. Third Year German. Oral training, grammar, composition reading. Two recitations a day will be held, with a sufficient interval to enable the student to prepare for the second recitation. Text-books: Joynes-Wesselhoeft's *German*

Lesson Grammar; Wildenbruch's *Das edle Blut*; Riehl's, *Burg Neideck*; Freytag's *Die Journalisten*. Prerequisite: two years of high school German or its equivalent. The completion of this course entitles the student to the third unit of entrance credit in German. Daily, 8 and 12. G. S. 177. Dr. ZINNECKER. University credit, five hours.

The instructor may be consulted T Th, 9, in room 178.

S 4. Advanced Composition and Conversation. Daily except Sat., 9. G. S. 190. Dr. ZINNECKER. Credit, two hours. This course will aim to train the students to write and to speak correct German. It will be conducted in German. Papers, based upon pictures and works of literature discussed orally in class, will be handed in regularly and corrected by the teacher. A few extra hours will be set aside for instruction in elementary phonetics.

S 5. Life and Works of Schiller. Daily except Sat., 10. G. S. 177. Professor POPE. Credit, two hours.

A comprehensive presentation of Schiller's life, work and personality, and of the influences determining his development. Lectures in German will alternate with class discussions. To meet the practical needs of teachers, Schiller's ballads and his principal dramas will be studied in detail.

Students are advised to provide themselves with some edition of Schiller's works.

LATIN

S 1. Third Year Latin, Cicero. Daily except Sat., 8 and 12. G. S. 128. University credit, four hours. Entrance credit, one unit. Professor COWLES.

This course is intended to afford any student the opportunity to complete by intensive work the reading ordinarily covered in the third year of the high school or preparatory course. The four orations against Catiline will be read, followed by that on the Manilian Law and either the *Archias* or one of the *Verrine* series, or both.

In connection with the reading, attention will be given to incidental topics, such as the oration form, Cicero's rhetorical ability, Roman political and social life as revealed in the orations, and the topography of the city of Rome. The syntactical side of the work will be emphasized, although an accurate knowledge of forms and inflections on the part of the student is assumed. Any standard text of Cicero may be used.

S 2. Latin Composition, and Teaching of it in the High School. Daily except Sat. 10. G. S. 128.

This course offers to teachers of Latin the opportunity for training in the theory and practice of composition, with discussion of methods, difficulties incident to the work as exemplified by the experience of members of the class, the place of composition in classical study, with emphasis upon important idiomatic usages and the elements of correct style. The work will embrace both oral and written exercises, prepared and unprepared. The subject will be approached through the English, and the translation of the content will be emphasized, rather than the literal rendering of words. Attention will be given to the opportunities for work in derivatives afforded by composition. Teachers are requested to bring with them the text-books in composition which they have been using.

S 3. Latin Language and Latin Syntax. A discussion of special topics in the history of the Latin language and a consideration of the most important and most characteristic features of Latin syntax. Daily except S, 8. Goldwin Smith 128. Professor DURHAM.

S 4. Martial's Epigrams. Daily except S, 9. Goldwin Smith 128. Professor DURHAM.

Courses S 3 and S 4 are primarily for teachers and graduate students. Those who wish to begin their candidacy for the degree of Master of Arts are requested to correspond in advance with Professor Durham and to bring with them at the opening of the Summer Session such credentials of undergraduate work leading to the degree A. B. as will entitle them to admission to the Graduate School.

In addition to the regular courses S 3 and S 4 intended for advanced students, regular conferences will be held and lectures will be given on collateral subjects in the field of Latin study.

HISTORY AND GOVERNMENT

S 1. American Government and Politics. Daily except Sat., 8. G. S. 234. Credit, two hours. Professor BRETZ.

A study of the leading questions of government and politics at the present time, the emphasis being upon the operations of the Federal government. Among the topics discussed are the power of the courts to declare legislation unconstitutional and the problems arising from the exercise of that power; the amendment of constitutions state and federal, with special reference to proposed amendments; citizenship and naturalization; the interpretation of the Fourteenth and Fifteenth Amendments; problems arising from our insular possessions; treaty-making; and other matters of current significance.

The reading of special assignments and their discussion will constitute the work of the course.

S 2. American History. The Period of Civil War and Reconstruction, 1850-1875. Daily except Sat., 10. G. S. 234. Credit, two hours. Professor BRETZ.

The course covers the political, social, and constitutional history of the period indicated. Special attention is given to new historical literature, biographies, memoirs, and published source material. The problems of the decade before the war, of the war, and of reconstruction are treated in the light of the present. The controversy over slavery is followed to its conclusion and attention is paid to the new national and industrial life created by the war. The problems of reconstruction and the political results of the policy of reconstruction are discussed in some detail.

[American History. The expansion of the United States across the Alleghany Mountains, 1750-1848. Daily except Sat., 10. G. S. 234. Credit, two hours. Professor BRETZ.

This course deals with the exploration of the trans-Alleghany country, the movement of population into the West, Indian wars and relations with foreign

powers on the frontier, territorial acquisitions, land policy, industrial development of typical communities, and in general with the social life of the new communities between the Alleghanies and the Mississippi. The plan is to supplement in some detail the customary treatment of American History and to emphasize the characteristic features of westward expansion.] Not given in 1918.

[American History. The Middle Period, 1815-1860. Professor BRETZ.

A general course covering the principal topics in the period indicated. J. S. Bassett's Short History of the United States will be used as a text, and special use will be made of William E. Dodd's Expansion and Conflict.] Not given in 1918.

S 5. [English History to 1485. Professor LUNT.

A survey of the salient aspects of political, constitutional, economic, and social development. The lectures deal with the land and the people; the development of a Teutonic civilization; the changes wrought in the social and legal frame-work by the imposition of feudalism; the foundation of the English constitution; the gradual rise of representative institutions; the relations with the continent; the introduction and spread of Christianity; the growing power of the church and the conflict between church and state; life in town and country; the growth of commerce and industry and the rise of the middle class; intellectual currents and the birth of modern England.] Not given in 1918.

This course is intended to provide a general introduction to English history.

S 6. English History, 1485-1917. Daily except Sat., 10. G. S. 242. Credit two hours. Professor LUNT.

A continuation of course S 5 to the present. The lectures deal with the part played by England in the international rivalries of the sixteenth century, the reformation, the economic and social changes under the Tudors, the struggle between crown and parliament under the Stuarts, the foundation and expansion of the empire, the growth of cabinet government, the economic revolution, parliamentary reform, parties and politics, and other similar topics.

S 7. English History since 1815. Daily except Sat., 9. G. S. 242. Credit, two hours. Professor LUNT.

The history of cabinets and parties, the development of the constitution, the social and economic changes, the foreign relations, and the relations with Ireland will be treated in the lectures with some fullness for the whole period. Other aspects of imperial history and colonial history will be touched upon only incidentally; but the instructor will be glad to arrange a systematic course of reading on these topics for students who may be interested. These aspects of the above topics will be studied among others: the political, social, and economic conditions at the close of the Napoleonic war; the great reforms, 1820-1850; the reconstruction of parties, 1846-1868; the foreign policies of Castlereagh, Canning and Palmerston, 1815-1866; the relations with Ireland, 1800-1868; the cabinets of Gladstone and Disraeli; the reforms of parliament; Irish home rule; the social legislation of the liberals, 1906-1914; foreign policy since 1870; the causes of the present war; and, if time permits, a brief consideration of the salient constitutional and economic changes caused by the war.

The course is intended primarily for teachers of English history in secondary schools for undergraduates and others who have already an elementary knowledge of English history, and for graduate students.

S 8. Seminary in English History. One two-hour session each week, at a time to be arranged. First meeting: Wednesday, July 10, 2-4 P. M. in the European Seminary Room of the University Library. Professor LUNT.

A course of research intended primarily for graduate students. The purpose is to give practice in the application of the principles of historical criticism in the medieval period and to study the problems which arise out of a chronicler's narrative. The work used this year will be the *Historia Maior* of Matthew Paris. The course is so organized that it may be taken in consecutive years without repetition of work. A reading knowledge of easy Latin is presumed.

S 9. History of France Under the Third Republic. Daily except Sat., 9. G. S. 234. Assistant Professor GUERLAC. Credit, two hours.

This course will cover the political, social, economic, colonial events of France from the foundation of the Republic, September 1870, down to the outbreak of the war, August 1914.

Special stress will be laid on some of the more important facts of the last forty-five years: the heritage of the Second Empire, the rapid recovery from the war of 1870, the evolution from a conservative republic to a radical democracy, the industrial progress, the creation of a vast colonial empire, with special reference to Morocco and its bearing on the international situation; the balance of powers in Europe and the system of alliances, the problem of Alsace-Lorraine, the German menace during the last ten years.

S 10. France and the French of To-day. M W F, 11. G. S. 234. Assistant Professor GUERLAC. Credit, one hour.

A general survey and description of France as she is to-day: her social structure, political organization, educational system, intellectual life. The different classes: farmers, workmen, bourgeois and the aristocracy. Some institutions characteristic of modern France. The war and its effects on the life of the country.

S 11. Relations Between France and the United States. T Th, 11. G. S. 234. Assistant Professor GUERLAC. Credit, one hour.

This course will attempt to present a general survey of Franco-American relations during the last hundred and fifty years and emphasize some of the more important contributions of France to American civilization.

S 12. American Political Institutions. Daily except Sat., 10. G. S. 245. Professor ORTH. Credit, two hours.

A general survey of the American governmental system, federal, state and local, and a study of the relation of the various parts to the whole, embracing particularly a scrutiny of the leading characteristics of the federal constitution, the separation of powers, and the method of amending; the executive department, presidential leadership, the appointing power and civil service, the war powers of the president, the treaty making powers of the president, and his control over foreign relations; the cabinet, the rapid recent growth of administrative functions; the Senate, its relation to the executive, recent changes in the mode of electing

senators, its effect upon the personnel and procedure; the House of Representatives, its financial power, a budgetary system, congressional aggression, the recent changes in the rules; the United States Supreme Court, its power over legislation and its attitude towards political policy; the relation of the federal activities to the state, particularly as pertaining to interstate commerce, and laws affecting the police power. Comparison of the state powers with the federal powers; the departments of the state government; the governor; the state legislature, its organization and powers; the recent revival of state activities, and the rapid development of Boards and Commissions. The relation of the city to the state; the mayor plan of city government, the Council plan, the board plan, the commission and commission manager plan. The county and township as administrative units. Local autonomy and national leadership.

S 13. The American Party System. Daily except Sat., 12. G. S. 245. Professor ORTH. Credit, two hours.

A study of the evolution of the American political party. The first part of the course embraces a historical survey of the parties from the Federalists to the present time, tracing especially the development of leading issues, and their effect upon party alignments. The second part of the course deals with the development of party machinery; the committees, state, local and national; party manipulation, party finance, the state, city and national machines, the Boss; politics and business, politics and labor, the awaking, the age of the muck-raker; nominating devices, the caucus, convention, primary and petition; the systems of registration and voting, the ballot, the Australian ballot, conduct of elections; the ossification of the party by state law; the new attitude of the state towards parties; state election machinery; state election laws; state supervision over party affairs; the party and public opinion.

ECONOMICS

The following courses are designed to meet the needs of three classes of students in the Summer Session: (1) those desiring regular college credit for general economics; (2) students with special interests in economic subjects; (3) students seeking broad preparation for the teaching of economics in secondary schools. For the first group, Course S 1 covers the subject matter usually included under elementary economics. For Cornell students Course S 1 substitutes for both terms of Economics 52 and will also serve in lieu of Course 51 as a prerequisite to admission to various advanced courses in Economics. Graduate students wishing to pursue special investigations will be afforded assistance by members of the Summer Session staff of instruction, and by other members of the Department of Political Science of the University who may be in residence in Ithaca during the summer.

S 1. Principles of Economics. Twice daily except Sat., 8 and 9. G. S. 264. Credit four hours. Mr. FISHER.

A general introduction to economics, covering the fundamental principles of value and the distribution of wealth, together with the elements of money and banking.

S 2. Money and Credit. Daily except Sat., 9. G. S. 236. Credit, two hours. Assistant Professor REED.

A study of the principles governing the mechanism of exchange: how the general level of prices is determined; effects of a changing price level upon investment operations; foreign and domestic exchange; the history of bimetallism in the United States; the present status of the gold standard; recent tendencies toward inflation.

It is recommended, but not required, that Theory and History of Banking be taken in connection with this course.

S 3. Theory and History of Banking. Daily except Sat., 12. G. S. 236. Credit, two hours. Assistant Professor REED.

The work of the commercial bank; national and state banking systems; the Central Banks of Europe; development and work of the American Federal Reserve System; the money market and organized speculation; financial readjustments occasioned by the European war.

This course and Money and Credit cover the field usually surveyed in college courses in Money and Banking. If possible, students in Theory and History of Banking should also take Money and Credit.

S 4. Corporation Finance. Daily except Sat., 11. G. S. 236. Credit, two hours. Assistant Professor REED.

A study of the organization, administration, and regulation of corporations. Particular attention will be paid to the financial aspects of the subject.

[Elements of Accounting. Credit, two hours. Assistant Professor ENGLISH.

The theory of debit and credit in double entry bookkeeping; the classification of accounts; the construction and use of a simple accounting system; the preparation and interpretation of financial statements.] Not given in 1918.

[Interpretation of Accounts. Analysis of Income Sheets and of Balance Sheets. Credit, two hours. Assistant Professor ENGLISH.

A study of the financial reports of corporations, including a discussion of the issue of stocks and bonds, of the problems connected with the valuation of assets, and of the accounting requirements of the Interstate Commerce Commission.] Not given in 1918.

MATHEMATICS

In addition to the courses noted below, each teacher will have regular office hours for consultation with students. It is urged that this opportunity be utilized by all concerned.

In the following list, courses 1 to 6 (2) are the equivalent of those having the same number in the Announcement of the College of Arts and Sciences for 1917-1918.

Courses 1, 2, 3 are planned for those teachers in the secondary schools who wish to review these subjects. They are equivalent to the advanced entrance requirements of Cornell University and of the College Entrance Examination Board. They presuppose a ready knowledge of elementary algebra (through quadratic equations) and of plane geometry. University credit, for 1, 2, 3, three hours each.

S 1. **Solid Geometry.** Daily, 11. White 21. Assistant Professor CARVER.

S 2. **Advanced Algebra.** Daily, 10. White 21. Assistant Professor CARVER. White 6. Assistant Professor HURWITZ.

S 3. **Trigonometry.** Daily, 9. White 6. Assistant Professor HURWITZ. Students taking S 6 (1) or S 6 (2) are advised to take no other University work during the summer.

University credit for S 6 (1) and for S 6 (2) six hours each.

S 6. (1). **Analytic Geometry and Calculus.** Daily, 8 and 11. White 2. Assistant Professor OWENS.

S 6 (2). **Analytic Geometry and Calculus.** Daily, 8 and 11. White 27. Assistant Professor SHARPE. White 1. Assistant Professor GILLESPIE.

MATHEMATICS FOR TEACHERS

S 7. **Projective Geometry.** M W F, 10. White 2. Credit one hour. Assistant Professor OWENS.

This course will consist of an introduction to the subject developing, as far as possible in the limited time, projective forms and constructions of the first and second degrees, with applications of the principles to elementary geometry.

The two following courses, while in no sense a review of the subjects named, are designed to assist secondary school teachers in acquiring a firmer grasp upon, and a broader view of, the entire field of school mathematics. Students contemplating taking either of these courses are advised to confer with the instructor before registering.

S 8. **Selected Topics Related to Elementary and Advanced Algebra.** M W F, 11. White 6. Assistant Professor HURWITZ.

S 9. **Selected Topics Related to Plane and Solid Geometry.** M W F, 9. White 21. Assistant Professor CARVER.

PHYSICS

All work in Physics is given in Rockefeller Hall. Regular University students may take work under the same conditions as prescribed for the regular University terms and credit will be allowed as indicated below.

All courses are open to teachers who can take them with profit. Those who have not had college physics are advised to take courses 2 or 3 and 10. Those who have had college physics may take courses 8 or 9 and 12 and the lectures in course 2 may be attended even if not taken for credit. Teachers are entirely at liberty to take portions of courses when such an arrangement is to their advantage. Every effort will be made to adapt the work to the needs of students and to give opportunity to profit from the exceptional equipment of the laboratory.

S 2. **Lectures with Experiments and Recitations.** Credit five hours. Daily 8-10, Rockefeller A. This course is intended to furnish a basis for all following courses as well as to give a fairly complete survey of general physics for those not intending to take up work depending directly on physics. The equipment for

lecture demonstration is unusually complete and has been given careful attention by many members of the staff. Teachers and others familiar with the elements of the subject may find the course useful and suggestive.

The lectures will be given daily at 8 and will be followed by an informal discussion or recitation at 9. Kimball's College Physics will be used for reference. Assistant Professor GIBBS.

S 3. Lectures, Recitations, and Problems. Credit six hours. The work in this course includes, in addition to the lectures and recitations as outlined and scheduled under Physics 2, two hours per week spent on problem work bearing directly upon the general subject matter of the course. This course will be given if six or more applications for it are received before the third day of instruction.

Problem work at hours to be arranged. Assistant Professor GIBBS.

S 5. Informal Conference Work for Teachers. Assistant Professor GIBBS
No University credit.

For the benefit of teachers who desire help in connection with the subject matter or other phases of their Physics training; consultation hours will be held by appointment.

If before the third day of instruction six or more teachers express a desire for an informal discussion or colloquium upon topics to be selected by the class from the subject matter of Physics, arrangement will be made to hold these discussions daily except Saturday at 12. It may be expected that these discussions will be such as would be engaged in with profit by those who have had an introductory course in College Physics.

Those who are registered in either Physics S 10 or S 12 and who take this work at 12 may arrange to start their laboratory work at 9 instead of 10.

S 8. General Physics. Recitations. Theory and problems covering mechanics and heat, with a critical study of temperature scales and temperature measurements. Credit two hours. Prerequisites; Physics 3 or the equivalent and a working knowledge of analytic geometry and the calculus. Daily exc., Sat., 8. Rockefeller 105. Assistant Professor BIDWELL.

S 9. General Physics. Recitations. Theory and problems covering the thermodynamic temperature scale and radiation; electrostatics, the electric current and electro-magnetics, etc. A continuation of Physics 8. Prerequisite: Physics 8. Daily exc. Sat., 9. Rockefeller 106. Credit, two hours. Assistant Professor RICHTMYER.

Physics S 8 and S 9 constitute a second course in College Physics. They follow more or less closely the subject matter given in the corresponding courses during the regular academic year, which courses are required of students in Sibley College. It is recommended that the corresponding parts of Physics S 14 should be taken simultaneously with Physics S 8 or S 9.

S 10. Physical Laboratory. This course may with profit be taken by teachers of elementary physics who wish to acquire a teaching familiarity with introductory laboratory work; and by those students who have had or are taking Physics 2 or the equivalent. The experiments offered include studies in units, statics, kinetics, properties of matter, light, sound, electricity and magnetism. A part of

the work is quantitative, designed to acquaint the student with a few of the methods of measurement; a part is qualitative, presenting such elementary physical phenomena as spectra of various substances, color of various illuminants, color mixture; a part consists in studying some of the fundamental physical laws and constants partly from the quantitative, partly from the qualitative standpoint.

The work may be varied and the material covered adjusted to suit the needs of the student, since the instruction is in all cases individual.

Credit one to three hours. Prerequisite Physics S 2 or the equivalent. (Open to students taking Physics S 2 simultaneously). One to five three-hour periods per week as arranged. Assistant Professors RICHTMYER and BIDWELL.

S 12. Physical Experiments. Primarily for teachers and students who wish a thorough introduction to the theory and methods of physical measurement and observations either as a preparation for graduate study or as an extension of previous work in Physics. The methods of setting up and adjusting apparatus, the study of sources of error and their elimination, methods of computation and arranging data, the interpretation of results, both analytically and graphically, are given special emphasis.

The large amount of apparatus available makes possible accurate measurements in the various branches of physics. The experiments offered comprise such subjects as force, work, power, efficiency of machines, linear and angular motions, moment of inertia, elasticity, vapor tension, a study of the analytical balance; velocity of sound in air and in metals, wave motion, vibration of strings and wires under tension; study of lenses and mirrors with special attention to the use of the spectrometer and the diffraction grating in measuring wave lengths of light and indices of refraction; photometry; in electricity and magnetism a special series of experiments is offered intended to give a thorough grounding in electrical measurements and at the same time to bring out the relations of the several electrical units to the fundamental units of mass, length, and time. By special arrangements, a limited number of experiments involving a study of dynamos and motors is also offered.

The instruction is individual and the topics covered may be adjusted to meet the needs of the student. Credit one to four hours. Prerequisites: the equivalent of eight hours of college physics (unless either Physics 8 or 9 be taken in parallel) and a knowledge of the elements of analytic geometry and the calculus. One to five three-hour periods per week. Daily, except Sat., 10-1 (or 9-12 by special arrangement). Rockefeller 252. Assistant Professors RICHTMYER and BIDWELL.

S 14. Physical Experiments. Students of whom Physics 14 is required in the regular academic year may substitute therefor Physics 12, as given in the summer session.

Advanced General Physics. The following courses, S 20a to S 23b, are suggested for students desiring to elect theoretical Physics in Summer Sessions. They are subdivided in such manner that the two parts of any topic are substantially equivalent to the corresponding courses as given during the college year. It is expected to complete this sequence of courses once in four summer sessions.

A student may elect either part of any of the topics without the other. In general those taking any of these courses should have completed the equivalent of Physics 2, 4, and 10 of the college year.

These courses may be taken for credit toward a master's degree in physics, subject to the requirements of the graduate school.

The courses that may be expected in the Summer Sessions of the years 1918-1922 are shown below:

1918 S 23b and 21a.

1919 S 22a and 21b.

1920 S 22b and 20a.

1921 S 23a and 20b.

1922 S 23b and 21a.

[S 20a. **Heat.** Expansion, thermometry, calorimetry, conduction and change of state.] Not given in 1918.

[S 20b. **Heat.** Kinetic theory, radiation, absorption and thermodynamics.] Not given in 1918.

S 21a. **Light.** Geometrical optics including reflection, refraction, chromatic and spherical aberration and optical instruments. Daily except Sat., 8. Rockefeller 109. Mr. MURDOCK. See note below.

[S 21b. **Light.** Physical optics including wave theory, dispersion, interference, diffraction and polarization.] Not given in 1918.

[S 22a. **Electricity and Magnetism.** Magnetism, static electricity, capacity, laws of Ohm and Kirchhoff, and direct current phenomena.] Not given in 1918.

[S 22b. **Electricity and Magnetism.** Thermo electricity, elementary electron theory and alternating current phenomena including self and mutual induction and high frequency, oscillations.] Not given in 1918.

[S 23a. **Properties of Matter.** Gravitation and a short study of the dynamics of solids.] Not given in 1918.

S 23b. **Properties of Matter.** Elasticity, dynamics of fluids, surface tension and viscosity. Daily except Sat., 12. Rockefeller 190. Mr. MURDOCK. See note below.

S 25. **Advanced Laboratory Practice.** Special laboratory work in Physics open to those students who have had Physics 12 or its equivalent and who desire to take up special subjects for detailed study putting more time on individual problems than is advisable in Physics 12. It is intended for those who desire to prepare for research work in Physics and for teachers in laboratory Physics in colleges. Credit varies with the amount of work done. The laboratory will be open daily except Sat., 9-12. Rockefeller 301. Mr. MURDOCK and other members of the staff.

NOTE.—If the number of students desiring to take courses S 21a and 23b should not be sufficient to warrant giving them, these courses would be withdrawn. If, however, six or more students notify the director of the Summer Session in writing, on or before June 15, 1918, of their intention to take one or both of these courses, the courses will be given. If at any time before June 15 the requisite number of applications for these courses has been received, those applying will be notified. If on June 15, the requisite number of applications for these courses has not been received, those who have applied will be notified.

S 44. X-Ray Laboratory. A special course in X-Ray photography and fluoroscopy will be offered for those qualified for the work. (See note below.) This will include operation of induction coils, transformers, various tubes, measurement of radiation and developing plates. The course is intended for those expecting to operate such apparatus in private or hospital practice as well as for students interested in mainly the physics of Roentgen rays. Plates and paper must be furnished by the students. July 29 to August 16, daily except Sat., 2 to 4. Mr. LARKIN.

NOTE.—This course will be given, if on or before July 15, 1918, six or more students make application for the course in writing to the Director of the Summer Session.

S 75. Special Topics or Investigation. Students who are prepared to profit by the use of the library and laboratory facilities of the department in the study of some special topic or in investigation will be given an opportunity to do so. This work may be taken in connection with or independently of any of the above courses and will be under the direction of one or more members of the staff with whom frequent conferences should be arranged. Credit varies with the nature and amount of work done.

CHEMISTRY

The courses announced below correspond entirely or in part with regular University courses. In numbering these summer courses, S has in each case been prefixed to the number of the corresponding course given during the regular sessions of the University.

The recitation and laboratory work will be arranged, within reasonable limits, to meet the individual requirements of teachers registered in the respective courses. For students wishing to obtain University credit, the requirements for admission to the courses will be the same as during the regular University sessions. For teachers not intending to have their work apply toward a Cornell degree, these requirements will not be rigidly enforced.

S 1. Introductory Inorganic Chemistry. a. Lectures daily except Sat., 12, Rockefeller B. Professor BROWNE and Mr. GRIFFIN. The lecture deals with the fundamental theories and laws of chemistry and with the more common elements and their compounds. They are profusely illustrated by experiments. The course is primarily designed to meet the needs of teachers in secondary schools, and to that end emphasis is laid upon methods of lecture presentation and experimental demonstration. Students other than teachers must, before registering, satisfy the department that they are properly prepared to carry on the work.

b. Laboratory work, M W, 8-12, and T Th F, 9-12. Morse Hall. Mr. FOGLESONG. A series of experiments designed to illustrate the fundamental laws of chemistry and to acquaint the student with the properties of the principal elements and their compounds. For the benefit of teachers who may take the course especial attention will be given to the methods of laboratory instruction, qualitative experiments, and the blowing of simple glass apparatus.

c. Recitations. T Th F, 8. Morse D. Mr. FOGLESONG. The recitations deal with the subject matter of the lectures and with the experimental work in the laboratory; thorough drill in the solution of chemical problems.

Credit for a, b and c, six hours.

S 6. Elementary Qualitative and Quantitative Analysis. This course is divided into two parts, either of which may be taken without the other. Credit, two, three, or five hours.

A. Qualitative Analysis. Lectures, M W F, 11, Morse 18. Laboratory, daily except Sat., 1.30-4.30. Mr. RIDER. An elementary course for those who have had the equivalent of course A. A study in laboratory and class room of the methods for detecting and separating the principal bases and inorganic acids. This is followed by the analysis of various substances, either in solution or in solid form, the composition of which is unknown to the students. Considerable emphasis is laid upon the writing of equations expressing the reactions involved in the work.

B. Quantitative Analysis. Elementary. Lectures, T Th, 11, Morse 18. Laboratory, M W F, 8-11. Credit, two hours. Mr. WYCKOFF.

An introduction to quantitative methods and the chemistry upon which these methods are based. Lectures, explanatory of the methods used, are first given; each student then performs simple analyses which involve the use of apparatus ordinarily employed in analytical work.

Advanced work (see course S 14) may be taken by students who complete this course before the close of the session.

S 7. Qualitative Analysis. Lectures and recitations, daily except Sat., 8, Rockefeller 109. Laboratory work, daily except Sat., 1.30-4.30, and M W F, 9-12. Mr. RIDER. Credit, one to six hours.

This course comprises (1) A study in class room and laboratory of the methods for detecting each of the important acids in the presence of the others, together with the reactions involved, followed by the analysis of more complex mixtures than those assigned in course S 6A; and (2) A comparative study in the laboratory of different methods of detecting and separating the bases.

S 12. Quantitative Analysis. Lectures, daily except Sat., 8. Morse C. Laboratory, daily except Sat., 9-1. Mr. WYCKOFF. Credit, four, five, or six hours.

A longer elementary course in which extended practice in volumetric and gravimetric analysis is offered.

S 14. Quantitative Analysis, Advanced Course. Laboratory practice at hours to be arranged. Credit, one, two, three, or four hours. Mr. WYCKOFF.

This course comprises instruction in certain gravimetric, volumetric, and electrolytic methods of analysis, and in the methods of combustion analysis. The work includes the analysis of iron ores, iron and steel, slags, coal and coke, cements and cement materials, alloys, ores of copper, lead, zinc, mercury, manganese, tin, etc.

S 16. Electrochemical Analysis. Laboratory practice at hours to be arranged. Credit, one hour. Mr. WYCKOFF.

A study of the most approved electrochemical methods for the determination of silver, lead, copper, tin, nickel, cobalt, and zinc. Practice will be given in the analysis of alloys and ores.

[S 19. **Qualitative and Quantitative Gas Analysis.** Lectures, daily except S., 12. Morse 18. Credit, two hours.

A detailed discussion of many representative types of apparatus employed by the gas analyst, and of the various methods of analysis involved in their use. Numerous simple problems are assigned which afford practice in the calculation and interpretation of the results obtained in gas-analytical work.] Not given in 1918.

[S 20. **Technical Gas Analysis.** Laboratory practice, at hours to be arranged. Credit, two hours.

The analysis of gas mixtures with the apparatus of Honigmann, Bunte, Orsat, Winkler, and Hempel; the complete analysis of flue gas, coal gas, Pintsch gas, Blau gas, natural gas, producer gas, acetylene, and air; the determination of the heating power of gaseous, liquid, and solid fuels, and the analysis of various substances by gas analytical methods involving the use of the different types of gas evolution apparatus such as the Scheibler calcimeter, the Hempel, and the Lunge nitrometer, the Lunge gasvolumeter, and the Bodländer gasbaroscope. Within certain limits the work may be selected to suit the requirements of the individual student.] Not given in 1918.

[S 24. **Opticochemical Methods.** Lectures, daily except S., 12. Laboratory practice at hours to be arranged. Credit, three hours.

The lectures deal with the construction and with the use in chemical analysis of the spectroscope, polariscope, refractometer, colorimeter, spectro-photometer and nephelometer. The laboratory instruction includes the following work: the observation and mapping of emission spectra of various elements in the Bunsen flame, the oxy-hydrogen flame, the electric arc, and the electric spark; the qualitative analysis of mixtures and minerals with the aid of the Krüss spectroscope and the direct vision spectroscope; the observation and mapping of absorption spectra; the examination and identification of rare earths and of organic dyes in solution, by means of their absorption spectra; the calibration of spectroscopes; spectrum photography with the Hilger wave-length spectrometer and with the Steinheil grating spectrograph; and practice in the use of colorimeters, polariscopes, and refractometers of various types.] Not given in 1918.

S 30. Organic Chemistry.

A. Aliphatic compounds. Lectures and recitations. Daily except Sat., 8. Morse 18. Laboratory practice at hours to be arranged. Credit, four to six hours. Mr. JACKSON and Mr. CORNWELL.

[B. Aromatic compounds. Lectures and recitations. Daily except Sat., 10. Morse 18. Laboratory practice at hours to be arranged. Credit, four to six hours.] Not given in 1918.

This course presupposes a knowledge of elementary chemistry.

S 31. Organic Chemistry.

A. Aliphatic compounds. Lectures and recitations. Daily except Sat., 8. Morse 18. Credit, three hours. Mr. JACKSON and Mr. CORNWELL.

[B. Aromatic compounds. Lectures and recitations. Daily except Sat., 10. Morse 18. Credit, three hours.] Not given in 1918.

These lectures and recitations are the same as those of Course S 30. Course S 30 should be taken in preference to course S 31 whenever it is possible.

S 32. Organic Chemistry, Shorter Course. Aliphatic and aromatic compounds. Lectures and recitations. Daily except Sat., 8. Morse 18. Five additional lectures and one recitation on the aromatic compounds are given during the last week of the session. Laboratory practice at hours to be arranged. Credit four hours. Mr. JACKSON and Mr. CORNWELL.

Course S 32 presupposes a knowledge of elementary chemistry, and is designed more particularly for students registered in the Colleges of Medicine and Agriculture.

S 34. Advanced Organic Chemistry. Laboratory practice at hours to be arranged. Credit, two or more hours. Mr. JACKSON and Mr. CORNWELL.

The course in the preparation of organic compounds is here continued, the preparations, however, being more difficult, and requiring more skill and experience on the part of the student.

S 37. Methods of Organic Analysis. Laboratory practice with occasional lectures. Hours to be arranged. Credit, two or more hours. Mr. JACKSON.

This course comprises the qualitative and quantitative analysis of pure organic compounds, and of such commercial products as alcohols, ethers, organic acids, glycerol, formalin, acetates, soaps, turpentine, rosin oils, etc.

[S 48. **Selected Topics in Advanced Inorganic Chemistry.** Lectures, M W F, 10. Morse D. Credit, one hour. Experimental lectures dealing with various topics in the field of general and inorganic chemistry, and covering some of the more important recent advances.] Not given in 1918.

[S 69. **Elementary Sanitary Chemistry.** Lectures, recitations, and laboratory practice. Credit, five hours. Lectures daily except Sat., 8. Morse D. Twenty hours of laboratory practice at hours to be arranged. Two recitation periods are included in this time.

The course is planned to serve as an introduction to the methods and objects of chemical science as applied to the problems of public health.

Course S 69 is the equivalent of the second term of course 69 given during the regular University session, and presupposes a knowledge of qualitative and quantitative analysis, and of organic chemistry.] Not given in 1918.

S 96. Research. Credit, one to six hours. Senior chemists, and others by special permission, may elect research under the direction of some member of the staff of instruction.

GEOGRAPHY AND GEOLOGY

Illustrated Special Announcement. A special announcement with many photographic illustrations showing typical features of the Cornell environment and the work of excursion classes in the field is published for the department and may be had post-free on application to the Director of the Summer Session. The text of this special announcement is devoted largely to an explanation of the advantages of the Cornell region for outdoor study of both geography and geology. As the special announcement was issued in 1914 it should be noted that there are changes in the courses as listed in the following paragraphs for 1918.

Equipment and Purpose. The lecture rooms and laboratories are in McGraw Hall. It is the purpose in this department to meet, primarily, the needs of teachers in grammar schools, high schools, normal schools, and colleges. A second aim is to provide courses of practical and cultural value to college students. The work embraces lectures, laboratory, and field instruction in physical and industrial geography, and in the elements of geology.

The environs of Cornell University are rich in phenomena of geographic and geologic interest. Consequently field excursions are made an especially important part of the work of this department in the Summer Session.

The laboratories are well equipped with apparatus and illustrative material for instruction. This material includes teaching and reference collections of minerals, rocks, fossils, maps, photographs, models, and more than five thousand lantern slides.

For entrance credit ($\frac{1}{2}$ unit) in physical geography, a student is required to attend, complete all required work, and pass the examinations in courses S 1, S 8, and S 10.

LECTURE COURSES IN GEOGRAPHY AND GEOLOGY

S 1. Physical Geography. An introductory course in physical geography covering most of the subjects treated in the modern texts, but touching more fully on the general concepts and the theoretical side of the subject than is possible in high school work. Some of the topics treated are the general form of the earth, origin, and distribution of relief features, processes and progress of the physiographic cycle and the resultant development of land forms, configuration of the ocean basins, nature and effects of the continental glaciation, and the bearing of these various phenomena on life relationships.

The lectures in physical geography are fully illustrated by lantern slides, wall and globe maps. Readings will be assigned in Tarr and Martin's College Physiography. Students registering in this course are advised to take also the related courses S8 and S10, and if possible S5. M T W Th, 9. Geological Lecture Room. Assistant Professor VON ENGELN. Credit, two hours.

Meteorology. See page 60.

S 2. Commercial and Industrial Geography. M T W Th, 11. Geological Lecture Room. Assistant Professor VON ENGELN. Credit, two hours.

The course will consist of lectures, text readings, and special topics for individual study and report. Consideration will be given to climatic factors in their relation to commerce and industry, to the occurrence and uses of agricultural, forest, mineral, and fish resources, to the distribution and magnitude of leading industries in their relation to geographic conditions, and to the relative importance of commercial routes as determined by their nature, facilities, and the character of products exchanged by their use. The course should be helpful to teachers of regional geography in the grade schools as well as to the commercial and industrial geography teacher in the high school.

S 5. Geology. A General Introductory Course. M T W Th, 10. Geological Lecture Room. Assistant Professor MONNETT. Credit, two hours.

Among the topics discussed are: origin of the earth; geological evolution of continents and ocean basins, the significance, areal distribution, and structural features of the great rock groups, as well as the forces modifying them; vulcanism, earthquakes, and similar phenomena.

The lectures will be illustrated with lantern slides, models, maps and specimens. Students registering for this course are urged to take the laboratory course S 9, and, if possible, course S 10.

LABORATORY AND EXCURSION COURSES IN BOTH GEOGRAPHY AND GEOLOGY

S 8. Physical Geography, Laboratory Course. The members of this class will make a systematic study of the physiographic Regions of the United States using contour maps, models and the experimental laboratory of the department in a laboratory study of the subject. By such study the topographic regional and life relationships (human, animal, and plant) of the geography of the United States will be correlated and presented as an orderly whole. The course will prove of worth to grade teachers of geography who wish to obtain a broader basis for their work in the subject as well as for those who expect to teach geography in the high schools.

A laboratory fee of \$1 must be paid to the Treasurer at the beginning of the session to cover laboratory maintenance. T Th, 2-4. Physical Geography Laboratories. Mr. ELSTON. Credit, one hour.

S 9. Geology, Laboratory Course. W F, 2-4. General Geology Laboratory. Assistant Professor MONNETT. Credit, one hour.

This course is designed to supplement course S 5. A study will be made of the more common structural phenomena; of the interpretation and uses of geological maps; of characteristic life forms developed in different geologic periods; and of the more common rocks and minerals. Short field excursions will be made to collect both rock specimens and fossils.

A laboratory fee of \$1 must be paid to the Treasurer at the beginning of the session to cover laboratory maintenance.

S 10. Geography and Geology, Field Course. This course should be elected by all those registering in course S 1 or S 5 and is required of all those who desire entrance credit in physical geography. With courses S 1 and S 8 it affords a comprehensive course in physical geography; with courses S 5 and S 9 it will give a similarly broad training in elementary geology, as the dynamic phases of geology are emphasized on the excursions. Mimeographed outlines of the excursions are to be secured by each student desiring credit.

Students not registered in the course or department are invited to attend these excursions but must conform to the directions of those in charge. Those desiring University or entrance credit must take field notes and hand in written reports. Excursions 1, 2, 3, 5, 6 are required of all students in the course, and in addition they must make either two of 7, 8 and 9; or one of 10 and 11 for one hour's credit.

Meeting place and time announced in mimeographed outlines or by Bulletin. Meet for first excursion, Monday, July 15, at Geological Lecture Room, McGraw Hall, 2.30 p. m. Excursions 1-6, Monday afternoons; 7, 8, 9, 11, all day Satur-

day; 10 starts on Saturday. On the excursions to which a cost is attached persons wishing to go must register at the department and secure tickets in advance of the date of the trip.

The longer excursions will be under the general charge of Assistant Professor von Engeln with the co-operation and assistance of the other members of the instructing staff. On the excursions stops will be made at points of interest, explanations made, questions asked, and discussion invited.

OUTLINE OF EXCURSIONS—Course S 10

Monday Afternoons

1. **Campus and Vicinity.** To study the action of streams and the progress and form of valley development. Visiting Alumni Field, upper Cascadilla Gorge, and Goldwin Smith Walk. July 15.

2. **Eagle Hill.** To become acquainted with the lay of the land about Cornell. to learn the place names of the broader physiographic features, studying enroute, processes of weathering, and, at the summit, the maturely dissected plateau. The top of the hill is a vantage point from which a good view of the lake and the land for miles to the north, east and west may be had. July 22.

3. **Fall Creek and Deadhead Hill.** To study the origin and nature of sedimentary rocks, also processes of erosion, transportation, deposition and cementation. An intimate view of one of the large gorges and its especial features, particularly Ithaca Falls. July 29.

[4. **Shore of Cayuga Lake.** To study shore line phenomena, joint planes, bedding, and stalactite formation. A walk for several miles along the east shore of the Lake. Probably return by trolley; if so, expense 15c to 20c may be paid at the time.] Omitted in 1918.

5. **Terminal Moraine. North Spencer.** By train or auto truck. Expense about \$1. To study a massive morainic loop, the basin in which the former ice tongue rested and the outwash deposits and overflow channels to the south. Truncated valley sides due to glacial erosion. The most striking examples of glacial phenomena in the Cornell Region. August 5.

6. **Six Mile Creek.** To study the effect of glaciation on a stream course. Relations to water supply and power development. A climb into and walk through one of the gorges in Six Mile Creek and an interpretation of its complicated physiographic history. August 12.

All-Day Excursions

7. **Taughannock Gorge and Falls.** By boat. Expense about 75c. To study the Inlet Plain, its reclamation, the Barge Canal terminal, the position and succession of the Devonian strata along the lake shore and the deep gorge and falls of Taughannock. A sail along the west shore of the lake and a walk through the great gorge to Taughannock Falls one of the highest straight falls east of the Rockies. Luncheon at the foot of the falls. July 20.

8. **Enfield Gorge and Falls.** By auto-truck. Expense about \$1.10. To study the relations of preglacial and hanging valleys and the postglacial and

interglacial gorges, their origin and features. Joint plane guidance of stream courses. A ride to the head of the gorge, climb through it to the crest of Lucifer Falls. Enfield is perhaps the most picturesque and wildest of the gorges in the Cornell Region. July 27.

9. **East Shore of Cayuga Lake.** Expense about \$1.10. To study the Devonian and Silurian rock exposures along the shores of Lake Cayuga; collection and interpretation of fossils from the various horizons and a study of the stratigraphy in its relation to economic geology and geography notably at the cement and salt plants. In charge of Professor MONNETT. August 10.

Longer Excursions

10. **Niagara Falls and Gorge.** By special train and trolley cars. If railroad conditions permit, otherwise omitted in 1918. Expense between \$8 and \$10. Overnight at Niagara Falls. August 10.

All the important scenic features of Niagara Falls and Gorge are visited and their physiographic history interpreted. As a whole these phenomena constitute a striking record of some of the most interesting chapters in the geologic and physiographic history of North America. Before the trip a special meeting of those interested will be held in the Physical Geography Laboratory when the relations of the different places will be explained and illustrated by large scale relief model of the Niagara Region. Students are advised to send to Director U. S. Geological Survey, Washington, D. C., for a copy of Niagara Folio, No. 190, in octavo form, cost 50c in coin or money order.

11. **Watkins Glen.** By auto-truck. Expense about \$2. August 3.

Watkins Glen is considered one of the most beautiful scenic spots in the country. It has been secured for a state park by New York and all parts of it made accessible. The excursion party will study the gorge, its pot holes and falls in detail; and consider its relations to the Seneca Lake Valley in comparison with the conditions at Ithaca as referred to the Cayuga valley. Ride across the dissected upland country to the south and west between Ithaca and Watkins.

ZOOLOGY

S 1. **General Zoology.** Lectures daily except Sat., 9. McGraw 5. Laboratory daily except Sat., 2-5.30. McGraw 2a. Credit six hours. Assistant Professor REED and Mr. SHADLE.

A general survey of the animal kingdom, the life processes, adaptations, reaction to environmental stimuli, the relations of animals and the principles of Zoology. Observations upon living animals both in the laboratory and in nature will constitute a portion of the course. An example of each animal group will be studied as a part of the laboratory work.

Laboratory fee \$6.

S 2. **Teachers' Course.** This course is adapted to the needs of those who are teaching or preparing to teach zoology and presupposes a training equivalent to that given in course A. The work includes the study of various forms of animals not included in general courses and instruction in the collection and

preparation of material for class use. Opportunity will be given for learning the fundamental principles of making permanent preparations of class material.

The laboratory work will be supplemented by field work in which attention is given to the natural habitat of animals and methods of collecting and preserving them for future use.

Hours to be arranged. Credit one or more hours. Assistant Professor REED and Mr. SHADLE.

Petrunkévitch's *Morphology of Invertebrate Types*, MacMillan & Co., and Guyer's *Animal Micrology*, Chicago University Press, will be found very valuable as reference books for this work.

S 3. Ornithology. Credit, three hours. Lectures T Th, 10. McGraw Hall 5. Laboratory M W or T Th, 2-5. Field work M W or T Th, 5.30-8 a. m. Laboratory fee, \$1.50. Assistant Professor ALLEN.

A course designed to give an introduction to the study of birds and a knowledge of the common species. The lectures will discuss such subjects as classification, migration, coloration, song, nest building, eggs, care of young, methods of attracting birds, economic importance, etc. The laboratory practice with bird skins will give an intimate knowledge of all the common birds of Eastern North America and familiarity with the use of a manual. The aim of the field work is the identification of birds in their haunts and observations upon their habits. Each student should be provided with Chapman's *Handbook of Birds of Eastern North America*, and with field or opera glasses.

SHOP WORK AND DRAWING FOR ENGINEERING STUDENTS

Drawing

For further information regarding course S 3, apply to Professor Pond; for information regarding the drawing and shop courses apply to Professor Kimball, 205 Sibley.

S 1. Mechanical Drawing. A course in drawing for beginners, covering use of instruments, orthographic and isometric projection, inking, tracing, conventions, working drawings, M W F, 8-11 and daily except Sat., 2-5. Sibley 203. Assistant Professor ———.

S 2. Machine Sketching and Drawing. A more advanced course in mechanical drawing for those who have had the equivalent of course S 1. Sketching of machine parts, machine drawing from sketches, empirical design. This course is an application of the work in course S 1 to such machine designing as can be done without a knowledge of mechanics. M W F, 8-11 and daily except Sat., 2-5. Sibley 203.

S 3. Descriptive Geometry. Lectures, daily except Sat., 9. Recitations and drawing daily except Sat., 10-12. Lincoln Hall. Assistant Professor POND.

A study of the representation of lines, planes, surfaces, and solids, and their interrelations. Warped surfaces. Tangencies. Intersections, shades and shadows, and perspective. The work is the same as that given in the regular C.E. course 1, and the student will receive four hours credit if he takes the whole course. A three-hour course that does not include shades and shadows and perspective,

and fulfills the requirements for the Mechanical Engineering students of Sibley College will also be given. The latter will be given from 2-5 p. m. if there are students enough to make up an extra section. The morning and afternoon sessions make it possible to readjust the above schedule so as to accommodate nearly all who wish to take either course.

Shop Work

S 4. **Pattern Making.** Use of woodworking tools; elements of pattern making. Mr. ———.

S 5. **Foundry Work.** Moulding, casting, mixing of metals, operation of cupola, etc. This course will be given only if the registration is large enough to warrant it.

S 6. **Forging, welding, tempering, etc.**

This course will be given only if the registration is large enough to warrant it.

S 7. **Machine Work.** Use of measuring tools; hand and machine tools; fitting and assembling.

Daily except Sat., 8-11, 1-5, and Sat., 8-11. Professor WELLS and Mr. ———.

MECHANICS OF ENGINEERING

Text-books: Church's Mechanics of Engineering, and Notes and Examples in Mechanics, supplemented by other printed notes and problems.

Course S 20 is the equivalent of M5 of Sibley College, or C.E. 20 of the College of Civil Engineering. Course S 21 is the equivalent of M6 of Sibley College, or C. E. 21 of the College of Civil Engineering.

S 21 includes Statics of a material point and of rigid bodies, and kinetics of rigid bodies.

Prerequisites, Integral Calculus.

S 22 includes strength of materials (that is, mechanics of Materials).

Prerequisite, the equivalent of Course S 21.

For a more detailed description of these courses see Announcement of the College of Civil Engineering, Courses 20 and 21.

A student taking either course for the first time is not permitted to take any other work unless permission to do so is granted him by the instructor in charge or by the class adviser of his college.

The courses are open to students from other universities subject to the same requirements for admission as made for Cornell students. Such students should bring with them official credentials from their universities showing that they satisfy the requirements for admission to the courses in question.

For further information concerning the Mechanics of Engineering, for the coming Summer Session, write to Professor E. W. Rettger, 321 Mitchell Street, Ithaca, N. Y.

Classes will be held in Lincoln Hall, Room 24; Office Room 22a.

MUSIC

Students may be admitted to this department only upon special application in advance to Professor Hollis Dann. For conditions of admission, see the special

announcement of the Department, which will be sent on application.

Admission of students in other departments of the Summer Session cannot be promised in advance, and is possible only to such classes as are not filled by the students taking Music exclusively.

First year courses are designated A; Second year, B; Third year, C; Fourth year, D; more advanced courses, E.

Sight Reading—A. For entrance to this course, the student must possess sufficient aptitude and ability to pursue the subject with profit, a singing voice of acceptable quality, and the ability to sing at sight familiar hymns and folk tunes.

In order to complete this course the student must be able to sing at sight individually, using the Latin syllables, music suitable for the first four years in the public schools.

Daily except Saturday, 12:00, Miss BARTHOLOMEW.

Sight Reading—B. This course requires singing at sight individually, with and without syllables, music suitable for the first seven years in the public schools.

Daily except Saturday, 9:15, Mr. COGSWELL; 10:10, Mr. SCALES.

Sight Reading—C. The student is required to sing at sight without accompaniment, reading words and music simultaneously, the music used in the upper grades of the public schools and in the high school, including music such as that found in Art Songs by Will Earhart. General review and individual singing of sequential studies. (See Dictation A and B).

University credit, one hour.

Daily except Thursday and Saturday, 11:05 (two sections), Mr. SCALES and Professor HOERRNER.

Proficiency in sight singing is of great advantage to the student entering the Supervisor's Course. Skill in sight singing may be acquired through home study. New students are urged to make preparation to pass one or more of the sight reading courses upon entrance, thereby conserving time and strength for other studies which cannot be pursued successfully at home.

Dictation—A. (Study of tone and rhythm). The subject matter of music is presented first to the sense of hearing. In this course the student gains the power to think tones and to sense rhythms and learns to recognize and write simple melodic phrases in all keys.

Each student is required to complete the oral and written dictation work of the first four years in music as outlined in the Complete Manual for Teachers by Hollis Dann, including singing from memory all sequential studies.

Daily except Saturday, 9:15 (two sections), Miss WHITE and Miss BARTHOLOMEW.

Dictation—B. This course deals with the problems of tone and rhythm included in the first seven years in the public schools.

Each student is required to complete the oral and written dictation, including all sequential studies, as outlined for the first seven years in the Complete Manual for Teachers.

University credit, two hours.

Daily except Saturday, 9:15, Prof. HOERRNER; 10:10, Miss WHITE.

Dictation—C. Open to students who have completed Harmony B.

This course includes some melodic dictation selected from the Supplementary Material in the Complete Manual for Teachers, pages 188 to 209. It will also include harmonic dictation in two and three parts. Aural recognition of intervals and chords in fundamental and inverted positions in major and minor tonalities.

University credit, two hours.

Daily except Saturday, 9:15, Miss WISENALL.

These courses in ear training, together with the courses in sight reading, harmony, and melody, give to the student a mastery of the elementary subject matter of music and constitute the fundamental training which is essential for advanced study.

The superiority of the best European schools of music over most American schools is largely due to the thorough three-year course in sight singing and dictation which is required of every student. The student in harmony and counterpoint hears and visualizes the chord and the melody before he writes them; the orchestral player hears the tones and feels the rhythm of a difficult passage before he plays it; the singer likewise acquires the musicianship which is evidenced by his ability to read and write the language.

The power to read and write a language with facility is a prerequisite to any advanced study of its literature. This is as true of Music as it is of English or French. The proper place for this fundamental training is in the elementary and secondary schools.

Students planning to enter the course for supervisors should acquire before entrance some degree of proficiency in recognizing and taking down simple melodies. For directions concerning home study, apply to the Principal of the Department of Music.

Materials and Methods—B. This course is devoted to the study and demonstration of material and methods for the Kindergarten and first four years in music. Special attention is given to the selection, presentation, and interpretation of rote songs for the primary grades, the presentation of the different tonal and rhythmic problems as they are taken up in successive years, the selection and use of material for the different grades, etc.

University credit, two hours.

Daily except Saturday, 11:05, Miss BRYANT.

Materials and Methods—C. This course is open to students who have completed Material and Methods B, and is devoted to the teaching and supervising of music in the upper grades, from the fifth to the eighth, inclusive. The work of each year is taken up in detail and the problems which confront the grade teacher and supervisor are carefully considered.

University credit, two hours.

Daily except Saturday, 10:10, Professor DANN.

On Friday of each week at 10:00, the lesson in methods will consist of a demonstration with a class of children from the Ithaca public schools. Students will thus have the opportunity of observing the practical application of methods to classes of children representing the several grades in the public schools.

High and Normal School Music—D. This is an advanced course to which only fourth year and more advanced students are admitted. The many difficult problems which confront the music teacher in the high and normal schools are carefully studied.

Some of the topics for special consideration are: the school chorus, glee clubs, classification of voices, grading and classification of high school students in music, bibliography of choral music suitable for high and normal schools, preparation for teaching in normal and training schools, elective courses, credits for the study of music both in and outside of the high school, etc.

University credit, two hours.

Daily except Friday and Saturday, 12:00, Professor DANN.

Practice Teaching—C. Once each week the entire class will observe lessons given to the model school children. Each student will do practice teaching under the supervision of the instructor.

Thursday, 11:05, Miss STONE.

Additional hours for Practice Teaching to be arranged with the instructor.

Practice Teaching—D. Open to fourth year students only. This course provides practical use of materials for all grades, and application of methods of teaching.

Each student will be given frequent opportunity for practice teaching under the supervision of the instructor. A model school consisting of a class of thirty children will be in attendance daily (a different grade each week) in order that the practice teaching and observation work may be carried on under actual school-room conditions.

No student can complete the course for supervisors until he is able to demonstrate his mastery of the subject matter and methods by actual teaching. It is highly important that each student shall have had some experience in teaching in the public schools before entering this class. **Previous experience in class teaching is invaluable and almost indispensable.**

University credit, one hour.

Daily except Saturday, 9:15, Miss BRYANT.

Rudiments of Music—A. This course provides instruction in the elements of music. The following are taken up for study: clefs, signification and origin; construction of major scale (without key-signature); normal, harmonic, and melodic minor scales; notation of chromatic scale with each key-signature; intervals and triads and their inversions.

New students are strongly advised to review thoroughly the subject matter of this course. Each should strive to acquire:

Facility in writing major, minor, and chromatic scales in all keys, with and without signatures, using both G and F clefs; ability to recognize and name intervals and triads and their inversions; the habit of thinking scale tones and triads by number names (beginning the minor with 1 the same as the major).

Daily except Wednesday and Saturday, 2:15, Mr. SCALES.

Harmony—A. Admission to this course requires a working knowledge of rudiments of music. Harmony A includes a review of major and minor scales, tetrachords and key signatures, technical names of scale tones (tonic, dominant, etc.); the study of intervals, analysis and location of triads, connection of triads for four voices in major and minor, authentic and plagal cadences. Text: Tapper's First Year Harmony.

University credit, two hours.

Daily except Saturday, 10:10, Miss WISENALL.

Harmony—B. Triad inversion, dominant seventh chord and its inversions, deceptive cadence, secondary seventh chords and their resolutions, suspension, altered chords, open harmony with primary triads. Texts: Tapper's First Year Harmony and Second Year Harmony.

University credit, two hours.

Daily except Saturday, 12:00, Miss WISENALL.

Melody—C. The principles of melody construction. Normal rhythms and voice progressions. Melody-writing, step-wise and with simple skips. The harmonic basis of melody. The phrase; the period.

University credit, two hours.

Daily except Saturday, 12:00, Mr. JOHNSTONE.

Melody—D. Melody-writing in major and minor with special reference to harmonic suggestion. Rhythmic variety; essentials of good melody; unity of text and music in rhythm and in emotional content. Melody-writing in two parts. Simple accompaniments.

University credit, two hours.

Monday, Wednesday, and Friday, 11:05, Mr. JOHNSTONE.

Advanced Chorus—Open to all B, C, and D students, and to A students who can qualify. Five periods a week are devoted to chorus singing and to instruction in the technical and interpretative elements of choral music. The work forms an important part of the training in Choral Conducting.

Topics for special consideration are: position, breathing, tone production, vowel study, interpretation, and the preparation and performance of choral music. Cantatas and choruses suitable for high and normal schools will be sung by the chorus at the concerts given by the Department of Music. Mr. BRAUN, accompanist.

Daily except Saturday, 8:00, Professor DANN.

Choral Conducting—D. Open to fourth year students only. The routine and technique of choral conducting. Each member of the class is required to prepare and conduct choral selections under the supervision of the instructor.

Daily except Friday and Saturday, 10:10, Professor HOERRNER.

Orchestral Conducting—D. Open to C and D students only. Orchestras from the Ithaca schools will be in attendance. Members of this class are required to attend at least three rehearsals of the Community Orchestra.

Thursday and Friday, 3:50, Mr. MATTERN.

Other hours for conducting to be arranged.

School Orchestra B, C, or D. Orchestras from the Ithaca grade schools and one from the Ithaca High School will be in attendance. A large repertoire of music suitable for school orchestras has been collected for the benefit of the members of the class, who will have the opportunity of observing and participating in the work of organizing, conducting, and developing the school orchestra.

Monday and Tuesday, 3:05, Mr. MATTERN.

Violin Classes—The Violin Classes, including classes for beginners, are open to all students taking the course for supervisors. These classes form an important and valuable supplement to the courses in School Orchestra and Orchestral Conducting. Each student should bring a violin if possible. Actual

work with the violin is an excellent way to acquire efficiency in dealing with many of the problems of the school orchestra.

Hours to be arranged, Mr. MATTERN.

Community Orchestra—Open to music students and to students in all other departments of the Summer Session who can play any instrument of the symphony orchestra sufficiently well to be of assistance in ensemble playing.

Wednesday, 7:30 p. m., Mr. MATTERN.

Orchestra, Material and Methods—Open to students taking the course for Supervisors of Instrumental Music. A specialized and detailed study of the problems connected with the organization and training of beginners in instrumental classes preparatory to the school orchestra. Actual playing and marking of supplementary violin studies and grammar and high school orchestra music, illustrating bowing, fingering, phrasing and tonal balance. Each student will be given the advantage of as much experience as possible in conducting the violin classes and school orchestras and will be required to play in the Summer Session Orchestra.

Hours to be arranged, Mr. MATTERN.

Song Interpretation—(To be taken with Rote Songs and Voice Training B or C). A series of demonstrations open to B, C, and D classes. Tempo, dynamics, phrasing, tone quality, enunciation, and other elements that enter into the artistic rendition of songs. Study of selected rote songs.

Tuesday and Friday, 2:15, Mr. JOHNSTONE.

Rote Songs and Voice Training—B or C. (To be taken with the course in Song Interpretation.) Topics: posture, breathing, principle of relaxation, tone quality, methods of presenting rote songs, care and training of the child voice, singing of rote songs. Each member of the class will be required to present a rote song.

Monday and Thursday, 2:15, Miss BRYANT.

Voice Training—D. Open to D and more advanced students only. Class lecture lessons. Individual and class instruction and demonstration. The foundation of singing, breath control; free vocal emission and aural appreciation; phrasing, accent, rhythm, and enunciation in artistic rendition; all leading to a strong vocalized declamation without unnecessary effort or complication.

Tuesday, Thursday, 11:05, Friday, 12:00, Mrs. HUNT.

Additional hours with small groups by appointment.

Principles and Practice of Teaching—D. This is a home-study course. The text book is *Education and Living* by Randolph Bourne, published by The Century Company, New York, Boston, Chicago, Dallas, Atlanta and San Francisco. A careful study of this book is required. A thorough understanding and appreciation of its contents will be found to be of very great practical benefit. The student's familiarity with the book will be taken for granted in the D Methods class. Fourth year students will write a summary of this book comprising not less than one thousand and not more than fifteen hundred words. The paper must be presented at the office of the Department of Music in the student's own handwriting on Monday, July 8.

History of Music and Current Events—C. This is a home-study course. An elementary examination in the history of music and current events for all C students will be given at 2:15 p. m. on Monday, July 8. (See History of Music D.)

History of Music and Current Events—D. A general knowledge of the history of music and a fair degree of familiarity with current events, especially in the world of music, is required. An examination will be given to the fourth year class covering only important and well known facts concerning the development of classical, romantic, and modern music; the great composers and their principal works; contemporary composers and their best known compositions; current events. Whatever special preparation is necessary must be made by means of home study. A History of Music by Stanford and Forsyth, published by The MacMillan Company, New York is suggested as a text book in the History of Music, and Musical America as a text for the study of current musical events. At least one question will have to do with general current events outside the subject of music. **The examination at the 1918 Session will be held at 2:15 p. m., Monday, July 8.**

Musical Appreciation—The analysis of musical art works with a view to forming a basis for intelligent criticism. The recognition of flaws and excellencies in a musical composition. Unity of design with variety of treatment. Rhythmic, melodic, and harmonic expedients employed by composers to portray varying emotional moods.

Musical instruments as means of expression. The orchestra and its instruments. Text: Johnstone's Instruments of the Modern Symphony Orchestra, (published by Carl Fischer).

Wednesday, 2:15, Mr. JOHNSTONE.

Orchestra and Band Technique—(Elective.) Open to advanced students who have completed Harmony D. Required only of students who are preparing to become Directors of Instrumental Music in the public schools.

Study of Band and Orchestra instruments separately and in combination. Class instruction will be supplemented by individual assistance enabling the student to become acquainted with the compass, fingering, and other details of the several instruments. A complete set of instruments will be provided for demonstration purposes.

Class hours and hours for individual instruction are to be arranged with the instructor who will devote a large part of his time to members of this class.

Daily except Saturday, Mr. GOGSWELL.

PROGRESSIVE SERIES OF PIANO LESSONS (Elective)

I. Elementary Grade.

University credit, two hours.

Daily except Saturday, hours to be arranged, Mr. KROEGER.

II. Intermediate Grade.

University credit, two hours.

Daily except Saturday, hours to be arranged, Mr. KROEGER.

Completion of Course I is a prerequisite for entrance to Course II.

Students who complete Courses I and II will receive a Certificate of Qualification to conduct both the Theoretical and Practical Examinations outlined in the standard Requirements for High School Credits on the Progressive Series of Piano Lessons.

Before receiving this certificate the student will be required to pass the above examinations.

Normal Course in Piano Teaching—This course covers the Elementary and Intermediate Grades of the Progressive Series of Piano Lessons; on completion the student will receive a certificate of qualification to teach these grades.

Only those students will be eligible to this Normal Course who possess a certificate of qualification to conduct the examinations outlined in the standard Requirements for High School Credits on the Progressive Series of Piano Lessons.

Any registered music teacher who desires to become familiar with the System may attend the classes of the Normal Course, but certificates will be issued only as above provided.

University credit, two hours.

Daily except Saturday, 3:05, Mr. KROEGER.

STATE COLLEGE OF AGRICULTURE

OFFICERS

Albert Russell Mann, A.M., Dean of the College of Agriculture and Director of the Experiment Station.
George Alan Works, M.S., Professor of Rural Education in charge of Summer Session in the College of Agriculture.
Cornelius Betten, Ph.D., Professor, Secretary, and Registrar.

STAFF OF INSTRUCTION

Susan Sipe Alburtis, J. O. Wilson Normal School, Washington, D. C.
W. P. Alexander, B.S., Assistant in Biology.
F. E. Andrews, Foreman of Instruction Flocks in Poultry Husbandry.
Elmer Eugene Barker, A.B., Ph.D., Assistant Professor of Plant Breeding.
Arthur Bishop Beaumont, A.B., Professor of Agronomy, Massachusetts College of Agriculture.
A. R. Bechtel, A.B., Instructor in Botany.
John Bentley, jr., B.S., M.F., Assistant Professor of Forest Engineering.
Irene Bricault, Director of Physical Training, Trumansburg, N. Y.
H. P. Buchan, Foreman Incubation and Brooding.
Mrs. Anna Botsford Comstock, B.S., Assistant Professor of Nature-Study.
Ralph Wright Curtis, M.S.A., Professor of Landscape Art.
Alfred Emerson, B.S., Instructor in Nature-Study.
R. J. Gilmore, Ph.D., Professor of Biology, Huron College.
Jeanne M. Gray, B.A., Director of Physical Education, New York State College for Teachers, Albany, N. Y.
L. A. Hausman, M.A., Instructor in Biology.
Arthur John Heinicke, Ph.D., Instructor in Pomology.
Laurence S. Hill, Director of Physical Training, Albany, N. Y.
Arthur Hollis, Student Assistant in Physical Education.
Caroline C. Johnson, Student Assistant in Physical Education.
Charles Kellert, Student Assistant in Physical Education.
C. H. Kennedy, B.S., Instructor in Entomology.
David Lumsden, Assistant Professor of Floriculture.
Edith H. Matzke, M.D., Lecturer on Hygiene, Cornell University.
C. L. Metcalf, A.M., Professor, Department of Entomology, University of Ohio.
Margaret Morrison, Student Assistant in Physical Education.
Loren Clifford Petrey, Ph.D., Syracuse University.
Harry E. Pratt, M.A., Principal Albany High School.
John M. Reed, Instructor in Athletics, Rensselaer Polytechnic Institute, Troy, N. Y.
Howard Wait Riley, M.E., Professor of Rural Engineering.
Lewis A. Roehl, Supervisor of Farm Shop Work.
Cora Smith, B.S., Teacher in Erie, Pennsylvania, High School.
William S. Taylor, M.S., Professor of Rural Education.
Clark Leonard Thayer, B.Sc., Instructor in Floriculture.
Edward Mowbray Tuttle, A.B., Assistant Professor of Rural Education.
Grace Waterman, Director of Physical Education, Emma Willard School, Troy, N. Y.
Karl McKay Wiegand, Ph.D., Professor of Botany.
Wilford Murry Wilson, M.D., Professor of Meteorology.

COURSES IN THE COLLEGE OF AGRICULTURE

The New York State College of Agriculture provides the following courses of instruction under the rules and regulations that follow:

1. **Admission.** The summer school in the College of Agriculture is especially designed to meet the needs of persons who are engaged in educational work. Teachers, supervisors, superintendents, extension workers, and others concerned with activities of an educational nature will be admitted regardless of previous academic preparation, others will be admitted only on the submission of evidence of having satisfactorily completed at least two years of work in Cornell University or some other institution of equal standing. Students must also conform to the regulations regarding attendance and registration on page 5 of this announcement.

Applicants for admission should send evidence of meeting these requirements to the Secretary of the College of Agriculture in advance of registration. The submission of this evidence will not constitute an obligation to attend but it is suggested as a means of avoiding delay at the time of registration.

2. **Tuition and Fees.** Tuition in any of the courses following is free to admitted students who are residents of New York State. Others will pay a tuition fee of \$30 whether one subject or more is taken. For the time and place of payment, see page 6.

In some of the courses a fee to cover the cost of materials used will be charged.

Fee cards must be procured from the instructor at the first exercise, and returned to him receipted within five days.

3. For special announcement regarding Physical Education see p. 61. An outline of courses for garden supervisors will be found on p. 72.

4. **Academic Credit for Work.** For the requirements for the degree B.S. (eight terms, 120 hours, etc.) see the Announcement of the College of Agriculture.

BIOLOGY

S 1. **General Biology.** Credit, three hours. Lectures daily, except Sat., 11. Roberts Hall 392. Laboratory and field work, sec. A, M W F, 2-4.30; sec. B, T Th, 2-4.30, Sat., 8-10.30. Roberts Hall 302. Professor METCALF and Mr. HAUSMAN.

This is an elementary course designed to acquaint the general student and the prospective teacher with the principal ideas of biology through selected practical studies of the phenomena on which biological principles are based. Laboratory fee, \$2.50.

BOTANY

The courses in botany are planned to meet the needs of high school and college teachers, as well as to furnish information for persons not intending to teach.

The work will consist of lectures, laboratory work, and field work. The lecture and classroom work will be supplemented by lantern slides, charts, microscopes, slides, museum and herbarium material. It is likely that some round table discussions will be arranged.

The region about Ithaca is especially rich in plant life. Rarely, if ever, is a locality found that is better adapted for summer field work in botany. The

richness of the fungous and the algal floras, as well as the great number of mosses, liverworts, ferns and flowering plants, render field work here especially attractive and valuable. Special attention is given to the field botany, although other phases of the work are not ignored.

The country in the vicinity of the University is very diversified; marshes, fields woodlands, ravines, and bogs all being accessible for day trips. Many short field trips will be taken and three longer all-day trips. Each student is expected to take at least two of the three all-day trips. The all-day trips will occur on Saturdays and will entail an extra expense of 50 cents to \$1.50 for each; one of the trips will cost \$2.50.

In addition to the laboratory fee in each course a deposit of \$2 will be required from each student to whom vasculums and other special apparatus are assigned.

Some of the excursions will be in rough and wild localities, and clothing suitable for such trips should be provided. Women are strongly advised to wear the bloomer costume. During recent years this costume has been very generally worn for such work. For one trip indeed, which, however, is not definitely required, the bloomer costume is really a necessity.

S 1. Elementary Botany. Credit, three hours. Lectures, M W, 8. Laboratory, M W, 9-1, F, 8-1, with additional reading or field work. Botanical Laboratory, Agronomy Building. Assistant Professor PETREY and Mr. ———.

Representative plants from all the larger plant groups will be studied. Emphasis will be placed on structure and life history with particular attention to evolutionary relationship. Some attention will be given to the economic aspects of the different groups, and to their adaptation to surroundings. Field work will replace laboratory hours to a limited extent and some all-day trips will be required.

This is a general course planned as an introduction to the study of botany and as a preparation for advanced courses. It is intended also to cover certain phases of college entrance requirements and of general secondary school botany. Laboratory fee, \$3.50.

S 2. Elementary Morphology of Seed Plants. Credit, one hour. Lectures T, 2-3. Laboratory T, 3-5:30, Th, 2-4:30, with some additional reading. Botanical Laboratory, Agronomy Building, Assistant Professor PETREY and Mr. ———.

A study of the variation in form and structure of roots, stems, leaves, flowers, fruits, and seeds, together with the terminology concerned, and the advantages of these variations. Modified plant parts, pollination, and seed dissemination will receive attention. Fundamental internal structure will be treated briefly. Laboratory and field studies, conferences, recitations, and reading.

The course is arranged somewhat after the plan of Gray's Lessons in Botany, and is designed as a preparation for systematic field Botany and for persons desiring a general knowledge of the common plants. It also covers certain phases of secondary school botany. Identification is not a feature of this course. Laboratory fee, \$2.

S 4. Identification, Classification, and Ecology of the Higher Plants. Credit two hours. Prerequisite: some training in structural botany taken previously or in connection with this course. Lectures, Th, 8. Laboratory or field, T, 8-1, Th, 9-1. Botanical Laboratory, Agronomy Building. Professor WIEGAND and Mr. BECHTEL.

A comprehensive study of the wild flora about Ithaca, with reference to the practical recognition of species and varieties as well as to the floral and foliar characteristics of these species and to the grouping of them into genera, families, and more comprehensive groups. The course consists of field and laboratory work, but is supplemented by general discussions and lectures on the broader questions of classification, nomenclature, distribution, and habitat. The ecological association and modifications of the various species and varieties will be noted. The course is intended to supply teachers and others with a general knowledge of the flora. Some all-day trips are required. Supplementary instruction will be given in the preservation of material for the museum and for the herbarium.

If necessary this course will be divided as follows: A. For those beginning this type of work. B. For students who already possess some knowledge of the flora. Laboratory fee, \$2.50.

S 5. Trees and Shrubs. Credit, two hours. Prerequisite: some training in structural botany, taken previously or in conjunction with this course. Lectures W, 2. Laboratory or field work M, 2-5, W, 3-5, F, 2-5. Agronomy Building. Mr. BECHTEL.

A course intended for those who desire more concentrated work on the woody plants of our flora than can be obtained in course S 4. The aim is to familiarize the student with as many as possible of the trees and shrubs in the Cayuga Lake flora, their floral and foliar characters, their structure, methods of growth, habits, and distribution. Much of the work will be in the field, supplemented by laboratory practice, lectures, and demonstrations. Some all-day trips are required. Laboratory fee, \$2.50.

S 8. Identification and Classification of Lichens, Liverworts, Mosses, and Ferns. Credit, one hour. Prerequisite: a general knowledge of structural botany. Laboratory and field work, T Th, 2-5, with some additional work by appointment. Botanical Laboratory, Agronomy Building. Professor WIEGAND and Assistants.

An introduction to the four groups of plants indicated by the title of the course. The student will become acquainted with the general structural characteristics of different members of these groups, and will receive practice in tracing the various species through the keys. The field trip is planned to acquaint students with the flora of our ravines and swamps which is especially rich in lichens, liverworts, mosses, and ferns. Material will be collected, identified, mounted in standard packets and will become the property of the student. Some all-day trips are required. Laboratory fee, \$2.

ENTOMOLOGY

S 4. Elementary Morphology of Insects. Credit, three hours. Laboratory open daily except Sat., 8-5; Sat., 8-1. Twenty-one hours of laboratory work per week required. Roberts Hall 391. Mr. YOUNG and ———.

An introductory laboratory course required of all students who plan to do advanced work in entomology. Laboratory fee, \$2.

S 6. Elementary Systematic Entomology. Credit two hours. Fifteen hours of laboratory work per week required. Must be preceded or accompanied

by course S 4. Laboratory open daily except Sat., 8-5; Sat., 8-1. Roberts Hall 391. Mr. YOUNG and ———.

Practice in the identification of insects, and in the method of phylogenetic study as illustrated by their wing venation. With course 4, required of all students who plan to do advanced work in entomology. Laboratory fee, \$3.

Members of the summer session may attend, in Roberts 392, Professor Needham's long-term course in the Ecology of Insects (Course 2: Lecture W, 8) or Professor Matheson's course in General Entomology (Course 3: Lecture W. F, 9) without credit.

FLORICULTURE

S 1. Garden Flowers. Credit, one hour. Lectures, M W, 8. Laboratory, F, 2-4:30. Greenhouses. Professor LUMSDEN and Mr. THAYER.

This is designed as an elementary course to be of value for home flower garden or school garden work. It is outlined so as to acquaint students with the most valuable material for this line of work, and to cover methods of propagation and culture.

S 2. Indoor Flower Growing. Credit, one hour. Lectures, M W, 10; Laboratory, W, 2-4:30. Greenhouses. Mr. THAYER.

The propagation and culture of plants suitable for winter gardens in school rooms, including a study of containers, soils, fertilizers, insecticides, is the basis of this course. The selection of varieties of bulbs and their methods of culture indoors is also considered, as is also the method of propagation and general care of species of plants suited for indoor culture.

S 3. Arrangement for Annuals and Herbaceous Perennials in the School Garden. Credit, one hour. Lectures, T Th, 10; Laboratory, M, 2-4:30. Greenhouses. Professor LUMSDEN.

A study of the principles and methods governing the selection of site, the arrangement of plant materials in the school garden; the planning and planting of flower borders to give a continuous display of bloom throughout the school year. Individual problems will be handled and aesthetic taste in color arrangement studied.

FORESTRY

S 1. Forests and Forestry. Credit, one hour. Lectures, T Th, 9. Forestry 122. Laboratory, F, 2-4:30. Forestry 118. Assistant Professor BENTLEY.

A course of lectures and field work covering in a broad way the field of forestry, with special reference to the present needs of the State and Nation. The subjects covered will be the care of woodlands; tree planting; measurement of logs, trees and stands; the use of wood and wood-products; the manufacture of lumber; the conservation and protection of the timber resources of the country. As far as possible the lectures of each week will be followed by practical observation lessons in the field, which will afford opportunities to see the application of the principles discussed in the lectures.

HOME ECONOMICS

S 1. Elementary Course in Foods. Credit, four hours. Lectures and recitations daily except Sat., 12. Home Economics Building 245. Laboratory practice daily except Sat., 8-11 or 2-5. Home Economics Building 270. Miss _____.

A course for establishing a fundamental knowledge of foods. The lectures will include a discussion of the sources, composition, and characteristics of food-stuffs; principles governing the selection of foods and methods of preparing them; comparative nutritive values and cost of foods. The laboratory work will follow the lectures closely, and will consist of experiments in determining the characteristics of food-stuffs and practical problems in the preparation of food. Special emphasis will be given to cooking foods which meet war conditions. The number registering for this course is limited to forty. This course does not parallel the regular course and is not accepted as a substitute from regular students. Laboratory fee, \$10.

S 2. Advanced Course in Food Preparation. Credit, two hours. Laboratory practice daily except Sat., 8-11. Home Economics Building 200. Miss _____.

A course in special methods in cooking. Open only to students having had Course S 1 or its full equivalent. The number registering for this course is limited to twenty. This course does not parallel the regular course and is not accepted as a substitute from regular students. Laboratory fee, \$10.

S 3. Human Nutrition. Credit, three hours. Lectures and recitations, daily except Sat., 11. Home Economics Building 100. Laboratory practice, T Th, 2-5.30. Home Economics Building 200. Written reviews for those wishing credit in the course, Sat., 11.

This course will include discussion of the fundamental principles of nutrition as these apply to the human being; the practical means of applying scientific principles in planning dietaries; special problems of nutrition, as the feeding of infants and children. Special emphasis will be placed at this time upon war problems in dietary planning. The laboratory work will consist of exercises in estimating comparative cost and nutritive value of various foods; in planning and judging various types of dietaries; in preparing typical meals. Open only to students who have had course S 1 or its equivalent. This course does not parallel the regular course and is not accepted as a substitute from regular students. Laboratory fee, \$7.50.

S 7. Elementary Clothing and Handwork. Credit, two hours. Practice daily except Sat., 8-10.30. Number of students limited to fourteen. Home Economics Building 305. Miss _____.

The course includes consideration of the following subjects: the use and care of the sewing machine; making of stitches by machine and by hand; elementary drafting and adaptation of patterns; cutting, fitting, and finishing simple undergarments; knitting, crocheting, and simple embroidery. Students provide all material, subject to the approval of the instructor. Estimated expenses, from \$5 to \$10. Laboratory fee, \$2.

S 8. Draping, Drafting, and Elementary Dressmaking. Credit, two hours. Practice daily except Sat., 2-5. Prerequisite course S 7 or its equivalent. Number of students limited to fourteen. Home Economics Building 305. Miss ——.

Practice is given in drafting, cutting, fitting, and designing of patterns. All foundation patterns are drafted to measure and fitted. Drafting of a tight-fitting lining, draping of a fitted lining, and draping of original and copied designs in muslin and other suitable materials. Elementary directions given for adjusting patterns to normal and abnormal figures. Making of a few simple models and of an unlined lingerie dress. Students provide all materials; estimated expense, \$8. Expense for dress form, \$4. Laboratory fee, \$3.

S 9. Dressmaking. Credit, two hours. Practice daily except Sat., 2-5. Prerequisite courses S 7 and S 8 or their equivalent. Number of students limited to fourteen. Home Economics Building 310. Miss ——.

This course includes the cutting and making of a middy blouse, a silk shirt waist, a wool skirt, and an unlined silk, linen, or wool dress. Students in this class use as far as possible the material designed in course S 8. One garment is drafted or modeled. The work consists in demonstrations, discussions, and practice. The purchase of an economical wardrobe will be considered; also a comparison of commercial products with those made by hand. Students provide all material, subject to the approval of the instructor; estimated expense, from \$15 to \$20. Laboratory fee, \$2.

S 10. Elementary Millinery. Credit, two hours. Practice daily except Sat., 8-10:30. Home Economics Building 300. Miss ——.

The course considers the methods of manipulation in the construction of hats out of wire, cape net, and rice straw; the preparation of trimming; the use and renovating of old materials; the study of color, shape, and trimmings as to suitability, becomingness, and income; criticisms of prevailing styles, and practice in making spring and winter hats of various materials; comparison of cost of the hats made with those in the stores. Students provide all materials; estimated expense, from \$6 to \$8. Laboratory fee, \$2 to \$3.

S 11. Textiles. Credit, two hours. Prerequisite course, General Chemistry. Practice M W F, 10:30-1. Lecture, T Th, 10:30-11:30. Home Economics Building 305. Miss ——.

This course includes: (a) a simple history of the processes of manufacture, spinning, weaving, and finishing of cotton, wool, silk, and linen; (b) an intensive study of fabrics with a view to their appropriateness in clothing, and an analysis of weaves and making of textile cards; (c) microscopic identification and chemical testing of fabrics, and the composition and characteristics of adulterants; (d) simple dyeing; (e) stain removal. Estimated expense \$5. Laboratory fee, \$2.

S 12. Survey Course in Clothing. Credit, two hours. Practice daily except Sat., 2-5. Registration limited to fourteen. Home Economics Building 300. Miss ——.

The course includes the making of a child's dress, a silk waist, a wool skirt and a dress. The material used in the dress depends upon the ability shown by the student. Commercial patterns will be studied and used. There will be a short study of textiles and design. Special attention will be given to finishes. Estimated expense \$15 to \$20. Laboratory fee \$2.

S 15. Home Economics in the Rural Schools. Credit, two hours. Lectures, T Th, 8. Home Economics 245. Laboratory practice, M W F, 2-5. Home Economics 200.

A course planned to give teachers in the rural schools material on which to base practical Home Economics instruction. A few of the essential phases of cooking, sewing and sanitation will be studied with reference to their use in the schools of the village or open country.

LANDSCAPE ART

S 3. The Arrangement and Planting of Home and School Grounds. Credit, one hour. Lecture, F, 8. Laboratory, T Th, 2-4.30. Landscape Art Building. Professor CURTIS.

An introductory course consisting of illustrated lectures to explain some fundamental principles and of field trips to identify and explain the use of important landscape plants. The purpose of this course is to give the students a point of view in landscape work and, in addition, to offer some specific suggestions for the solution of simple problems.

METEOROLOGY

S 1. Meteorology and Climatology. Credit, two hours. Lectures, M T Th, 10, Roberts Hall 292. Laboratory, W F, 2-4:30. Professor WILSON.

This course is adapted to the needs of teachers and students of subjects in which weather and climate are important factors, particularly students of physical geography and general agriculture. It is designed to acquaint the student with the laws governing the primary and secondary circulation of the atmosphere and with the development, progression and conditions that attend cyclones, tornadoes, and other atmospheric phenomena.

Attention is given to the principles and practice of weather forecasting from weather maps and from local observations.

The laboratory practice consists of the study of the principle weather and climatic elements with the aid of maps, charts, and instruments.

NATURE-STUDY

S 1. General Nature-Study. Credit, two hours. Lectures M W F, 10. Field and laboratory observations, T Th, 10-12:30. Roberts Hall 302. Assistant Professor COMSTOCK.

The object of this course is to train teachers in making personal observations along several lines of nature-study and to give them a foundation for carrying on the work independently. As many as possible of the laboratory periods will be spent in the fields in the study of birds, trees, and plants. Special attention will be given to observing the relation of insects to flowers of field and garden. The lectures will supplement the field and laboratory work, and will also present practical methods for conducting nature-study in the grades.

S 2. Natural History of the Farm. Credit, one hour. Lectures M, 8. Roberts Hall 392. Field work, sec. A, T Th, 2-5; sec. B, W F, 2-5. Mr. ALEXANDER.

This is primarily a field course, treating of the wild inhabitants of the fields, woods, marshes, and streams of the farm. Wild organisms will be compared with domesticated ones, and the availability of certain wild forms for cultivation will be pointed out.

The following topics, among others, will be studied: wild fruits, wild roots, wild cereals, deciduous trees, evergreens, pasture plants and their fitness for pasture conditions, wild birds, wild mammals, and fishes and other inhabitants of the farm stream.

Each student will be required to do a considerable part of the work individually. Field reports must be handed in weekly and these will be carefully graded. Laboratory fee, \$1.

S 3. Seminary in Kindergarten Methods in Nature-Study. M, 2. Insectary. Intended primarily for those taking Course S 1 above. A conference on methods of presenting nature-study materials to small children. Assistant Professor COMSTOCK.

S 4. Advanced Nature-Study. Credit, one hour. Lecture, W, 12. Insectary. Only those who have had course S 1 are eligible. A course on nature-study reference books and nature literature.

S 5. Garden Pests. Credit, two hours. Lectures, T Th, 8. Laboratory and field work, M W F, 9-11. Insectary.

This course is designed especially as an aid to teachers of gardening. It deals with common garden insects and their natural foes. The laboratory periods are devoted to a personal study of the life histories of insects and methods are employed that may be used in nature-study lessons supplementary to school gardening.

PHYSICAL EDUCATION

Object of the Courses. The law requiring that physical training be taught in the public schools of the State has created a demand for teachers and supervisors in this subject. It has been especially difficult to secure properly prepared supervisors in the rural schools. In order to assist those desiring to prepare for this work the New York State College of Agriculture is offering courses to meet the needs of both teachers and supervisors.

The courses have been carefully graded into a four-year Summer School schedule. This will enable students, teachers and supervisors to enter upon a complete and systematic study of this subject until a Summer School certificate has been earned. It will also enable them to engage in teaching during the year and thus acquire necessary experience.

Tuition. There is no tuition charged but students registering in the Summer School of Physical Education are required to pay an incidental fee of \$5. Admission to classes is restricted to duly registered students.

Advanced Standing. All students desiring advanced standing in the Summer School of Physical Education will be required to send a certified copy of the courses in which they wish to receive credit, with an explanation of the amount and character of the work accomplished, to the Supervisor of Physical Education,

Summer Session, College of Agriculture, at least one week before the session opens, or to pass examinations in those subjects in which they wish to receive credit. Examinations will be held in Roberts Hall, on July 6, at 9 o'clock.

Certificates for Work Done. At the end of each Summer Session a certificate of attendance is issued to all students completing satisfactory work. See page 8.

Summer School Certificate. All students desiring to receive the Summer School Certificate in Physical Education will be required to complete the four summer courses. No Summer School Certificate will be awarded to any student who has not attended at least two full summer sessions.

Admission. No one will be admitted to the courses in Physical Education who is not a high school graduate or who has not completed equivalent work or is engaged in teaching physical training. Evidence of having met this requirement should be sent to the Secretary of the College of Agriculture in advance of registration. The submission of this evidence will not constitute an obligation to attend but it is suggested as a means of avoiding delay at the time of registration. See page 54 of this announcement.

Costumes. Women *must* provide themselves with all-white middy blouses (no colored collars), black or dark blue bloomers, black stockings, black ties, and white tennis shoes.

Men *must* provide themselves with quarter sleeve tennis or gymnasium shirts, long Y. M. C. A. trousers (blue with white stripe), and white tennis shoes.

Residential Halls—Rooms—Board. See page 8. It is suggested that women students of the Summer School of Physical Education apply for rooms in Sage College in which one of the gymnasiums is situated. Rooms are reserved in the order of application.

SUGGESTED ORDER OF COURSES

First Year

Physiology S 2.
Athletics S 1.
Physiology S 1.
Hygiene S 1.
Athletics S 2.
Athletics S 4.
Athletics S 5.
Athletics S 6.
Practice S 7.

Third Year

Hygiene S 3.
Education S 3.
Education S 4.
Physiology S 3.
Athletics S 2.
Athletics S 3.
Athletics S 4.
Athletics S 5.
Practice S 9.

Second Year

Education S 1.
Education S 2.
Hygiene S 2.
English S 1.
Kinesiology S 4.
Athletics S 2.
Athletics S 3.
Athletics S 4.
Athletics S 5.
Practice S 8.

Fourth Year

Education S 5.
Physiology S 4.
Mechanotherapy, S 5.
Organization S 1.
Education S 6.
Mechanotherapy S 6.
Athletics S 2.
Athletics S 3.
Athletics S 4.
Athletics S 5.
Practice S 10.

Students desiring a certificate of proficiency indicating the completion of the four-year course will be required to carry an approved program each year. Four years' attendance does not insure the securing of this certificate. A certificate of attendance is issued at the end of each summer session. Students doing satisfactory work will be recommended for temporary licenses. Advanced credit will be given for work done elsewhere but no student will be given a certificate of proficiency with less than two summers of residence.

EDUCATION

S 1. Educational Psychology. Credit, two hours. Daily, 8. Caldwell Hall 100. Principal PRATT.

The general principles of Educational Psychology with special reference to Physical Education. A series of lectures to interpret to the student the ground work of present day knowledge in this special field with special reference to teaching.

S 2. Philosophy of Physical Education. Credit, one hour. T Th S, 10. Caldwell Hall 143. Principal PRATT.

This course includes an outline of the history of Physical Education, a brief survey of the several systems developed at home and abroad, and a discussion of Physical Education as a necessary factor in the general scheme of universal education; it will present the modern view of Physical Education versus Physical Training and correlate the functions of Physical Education with those of formal instruction in the school curriculum. This course furnishes the basis of Education S 4 and S 5.

S 3. Nature and Function of Play. Credit, two hours. Daily, 9. Caldwell Hall 143. Principal PRATT.

This course includes the theories of play, its values and utilities, the periods of growth, moods and development in the play instinct and its part in the educative process.

S 4. Principles of Physical Education. Credit, two hours. Daily, 10. Caldwell Hall 100. Mr. HILL.

This course will include the theory of teaching gymnastics and calisthenics, simple gymnastic positions and movements, miscellaneous exercises, gymnasium tactics and apparatus work; the pedagogical principles involved in calisthenics or drills, the physiological principles, general order or exercises in a drill, factors which guide us in the selection of exercises, how to write a drill and how to plan gymnastic lessons for use in the elementary schools; the principles of posture—normal and abnormal.

S 5. Principles and Practice of Teaching Physical Training. Credit, two hours. Lectures and practice, daily, 8. Roberts Assembly. Mr. HILL.

The methods of teaching physical training, observation and criticism and the actual presentation of assigned work will be included in this course. Work adapted to rural schools will receive special emphasis.

S 6. History and Systems of Physical Education. Credit, one hour. M W F, 10. Caldwell Hall 143. Assistant Professor GRAY.

The object of this course is to give the student a connected outline of the rise and development of Physical Education from the time of the Greeks and Romans through to the present day; to impress the importance of national health by thorough knowledge of the causes of the success and failure of ancient peoples; and to emphasize the present-day attempt to make bodily activity a recognized factor in moral and mental as well as in physical development.

HYGIENE AND SCHOOL INSPECTION

S 1. Personal Hygiene. Credit, two hours. Daily except Sat., 2. Stimson Hall. Dr. MATZKE.

The right use and proper care of the human mechanism; health habits; the sense organs; the nervous system; the contributing causes of poor health; the carriers of diseases; the prevention of bacterial and of degenerate diseases.

School Hygiene and School Inspection. The course will afford practical assistance to all teachers and will include a consideration of health and sanitary inspection of the classroom; the appointment and duties of pupil health officers and pupil sanitary inspectors; inspection for signs of abnormality, and injury or illness, for conditions which call for immediate attention on the part of the teacher, and for signs of disordered health for which children should be kept at home; the detection of defective sight and hearing.

S 2. Physical Diagnosis. Credit, two hours. Daily except Sat., 9. Stimson Hall. Dr. MATZKE.

The appearances, conditions, defects, deformities likely to be met in the examining room.

S 3. First Aid and Home Nursing. Stimson Hall. Dr. GORDON.

The lectures on first aid and home nursing will follow the plan of the American Red Cross Society.

Physical Examinations and Personal Conferences. A physical examination is offered every woman student entering the Summer Session for the first time. Individual appointments will be made for consultation and examination at the office of the Medical Adviser of Women in Sage College. Consultations are open to all women registered in the Summer Session. Doctors MATZKE and GORDON.

S 4. Kinesiology. Credit, two hours. Lectures and demonstrations. Daily, 2. Assistant Professor GRAY.

This course deals with the principles and mechanisms of bodily movements. The mechanism of representative types of exercise is studied for the purpose of determining, as far as possible, their immediate and permanent effects upon the health of the body.

S 5. Prescription of Exercise. Credit, one hour. T Th S, 9. Miss WATERMAN.

A course in gymnastic therapeutics, including the adaptation of methods of exercise to the development of the individual, the selection of exercises in relation to the age, growth and efficiency of the individual, exercises for the correction of postural and developmental defects, and the use and benefit derived from special gymnastic appliances.

S 6. Mechanotherapy. Credit, one-half hour. T Th, 2. Miss WATERMAN.

This course deals with the principles and application peculiar to massage; its physiological effects, application over joints, muscles, and vital organs, the different methods of application, and the general rules involved in procedure.

ENGLISH

S 1. Oral English. Credit, one hour. M W F, 10. Principal PRATT.

This course is designed to present the principles of correct and effective speech. The content and scope of the work will be adapted to the needs of the particular class. The material for practice will be drawn largely from the classroom product of the courses in Education and from the student's experience in teaching.

ORGANIZATION

S 1. Practical Conduct of Playgrounds, and Construction and Equipment. Credit, one-half hour. T Th, 2. Mr. HILL.

This course deals with play programs, how to organize playground staff, how to plan and construct a playground, its equipment, the field house, etc., the details concerned in playground management and the play festival.

PHYSIOLOGY

The four courses in physiology will cover those phases on anatomy, histology, and physiology that are essential to an understanding of the practical phases of the work in physical education.

S 1. Physiology. Credit, one hour. M W F, 10. Professor GILMORE and Mr. ———.

S 2. Physiology. Credit, three hours. Lectures, daily, 8. Laboratory, T Th S, 9-11. Professor GILMORE and Mr. ———.

S 3. Physiology. Credit, two hours. Lectures, daily, 2. Professor GILMORE and Mr. ———.

S 4. Physiology of Exercise. Credit, one hour. M W F, 9. Professor GILMORE and Mr. ———.

ATHLETICS

S 1. Theory and Practice of Group Athletics. Credit, one hour. M W F, 9. Mr. HILL.

In this course the general idea of group athletics, the badge test, scout work, and other organizations, and athletic meets, with special reference to rural districts will be taken up and practical demonstrations given.

S 2. Theory and Practice of Field and Track Athletics. Credit, two hours. Lectures and practice, daily for men, 4-6. Credit, one hour. Lectures and practice, daily for women, 4:30. Mr. REED and Miss BRICAULT.

The work consists of the theory and practice of the various track and field events, such as hurdling, standing and running broad jump, standing and running high jump, racing start, short and long distance running, shot put, base ball throw, basket ball throw, etc. The duties of the officials in a competitive meet are thoroughly explained and studied.

PHYSICAL EDUCATION COURSE

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First Year	Second Year	Third Year	Fourth Year
8-9 Physiology S 2	Education S 1	Pageantry	Education S 5
9-10 Athletics S 1, M. W. F.	Hygiene S 3	Education S 3	Physiology S 4, M. W. F.
Physiology S 2, T. Th. S. (Laboratory)			Mechanotherapy, T. Th. S.
10-11 Physiology S 1, M. W. F.	English S 1, M. W. F.	Education S 4	Education S 6, M. W. F.
Physiology S 2, T. Th. S.	Education S 2, T. Th. S.		Organization S 1, T. Th. S.
11 Calisthenics, M. W. F.	Special Practice, M. W. F.	Swedish, M. W. F.	Military Drill
11:20 Tactics adapted to the Schoolroom, T. Th. S.	Folk Dancing, T. Th. S.	Tactics, T. Th. S.	
11:25 Indian Clubs, M. W. F.	Gym. and Playground Tactics, M. W. F., Swedish, T. Th. S.	Wands, M. W. F.	Folk Dancing, M. W. F.
11:45 Tumbling, T. Th. S.		Rhythmic Steps, T. Th. S.	Special Features, T. Th. S.
11:50 Wands, M. W. F.	Indian clubs, M. W. F.	Apparatus, Men	Apparatus, Women
12:10 Dumb-bells, T. Th. S.	Tumbling, T. Th. S.	Apparatus, Women	Apparatus, Men
12:15 Swedish	Wands, M. W. F.	Indian clubs, M. W. F.	English Country Dancing, M. W. F.; Games, T. Th. S.
12:35	Dumb-bells, T. Th. S.	Games, T. Th. S.	Games
12:40 Apparatus, Men	Apparatus, Men	Games	
1:00 Apparatus, Women	Apparatus, Women		
2:00 Hygiene S 1, M. W. F.	Kinesiology S 1	Physiology S 3	Organization S 2, M. W. F.
3:00 Hygiene, S 1, T. Th. S.			Mechanotherapy, T. Th.
3:00 Aesthetic Dancing	Aesthetic Dancing	Games of High Organization for Rural Schools and Yards	Games of High Organization for Rural Schools and Yards
3:30		Aesthetic Dancing	Aesthetic Dancing
3:30 Games of Low Organiza- tion for Rural Schools and Yards	Games of Low Organization for Rural Schools and Yards		
4:00			
3:00 Athletics S 3	Athletics S 3	Athletics S 3	Athletics S 3
4:00			
3:30 Athletics S 2, Women	Athletics S 2, Women	Athletics S 2, Women	Athletics S 2, Women
4:00			
4:00 Athletics S 5	Athletics S 5	Athletics S 5	Athletics S 5
4:30			
4:30 Athletics S 4	Athletics S 4	Athletics S 4	Athletics S 4
5:30 Alternating Days	Alternating days	Alternating days	Alternating days
4-5 Athletics S 2, Men	Athletics S 2, Men	Athletics S 2, Men	Athletics S 2, Men
5:00 Athletic Dancing	Athletic Dancing	Athletic Dancing	Athletic Dancing
5:30			

Afternoon classes for the first, second, third, and fourth years are the same with the exception of Aesthetic Dancing.

SUMMER SESSION

S 3. Football. Credit, one hour. Daily, 3.

The course in football includes demonstrations and discussions in the preliminaries and fundamental football; offensive and defensive tactics; team and individual play; various systems of coaching; field generalship; training; etc. The rules of the game are thoroughly explained and interpreted.

S 4. Hockey and Tennis. Credit, one hour. Alternating days, 4:30. Miss BRICAULT.

Full instruction is given in Field Hockey, a popular athletic game, which affords exhilaration as well as plenty of vigorous exercise. A definite explanation and a thorough study of each rule is made, the advantages and disadvantages of certain plays are fully discussed and demonstrated, and actual participation in competitive games is experienced.

In tennis the various strokes, methods of serving and receiving are taught, as well as the advantages of matches and tournaments.

S 5. Soccer. Credit, one hour. Daily, 4. Miss BRICAULT.

Full instruction is given in Soccer, a game similar to Field Hockey, in which the same formation is used. This game is extremely popular, especially in rural communities.

S 7. First Year Practice. Credit, four hours. Daily, 11-1, 3-5. Gymnasium.

This includes elementary practice in calisthenics, schoolroom tactics, aesthetic dancing, indian clubs, wands, dumb-bells, Swedish gymnastics, football, hockey, tennis, apparatus in use on rural playgrounds, tumbling, athletic dancing, track and field athletics, and games of low organization.

S 8. Second Year Practice. Credit, four hours. Daily, 11-1, 3-5. Gymnasium.

Second year or intermediate practice includes gymnasium and playground tactics, aesthetic dancing, indian clubs, wands, dumb-bells, Swedish gymnastics, football, hockey, tennis, apparatus, tumbling, athletic dancing, track and field athletics, and games of low organization.

S 9. Third Year Practice. Credit, four hours. Daily, 11-1, 3-5.

Tactics, aesthetic dancing, fancy steps, indian clubs, wands, Swedish gymnastics, soccer, hockey, tennis, apparatus, athletic dancing, games (including highly organized games such as basket ball, baseball, etc.), track and field athletics, games of high organization, boxing and wrestling, are taught in this course. This is an advanced course.

S 10. Fourth Year Practice. Credit, four hours. Daily, 11-1, 3-5.

Work in military tactics, aesthetic dancing, folk dancing, English country dancing, special features, soccer, hockey, tennis, apparatus, athletic dancing, basketball, baseball, track and field athletics, games of high organization, boxing and wrestling is taken up in the fourth year. This course is for advanced students.

Men and women take most of the practical work in common, but they are separated for the heavier forms of gymnastics and athletics.

The above practice courses are taken in twenty and thirty minute periods with five minutes rest periods between. The afternoon work for the first and second year and that for the third and fourth year is the same with the exception of aesthetic dancing. Thus a student may take two years to complete the work of the afternoon session and so make his program lighter.

COURSES FOR PLAY LEADERS AND DIRECTORS

For those desiring to equip themselves as playground teachers and directors the following courses are suggested as essential:

Education S 1. Educational Psychology.

Education S 3. Nature and Function of Play.

Organization S 1. Practical conduct of Playgrounds, and Construction and Equipment.

Athletics. Theory and Practice of Group Athletics.

Athletics. Theory and Practice of Field and Track Athletics.

Activities: Games of low and high organizations; apparatus; rhythmic steps; folk dances; English country dancing; special features; organized games; and general practice work.

Special Courses. Special courses in the following subjects will be offered free of charge to advanced students registered in at least five hours work daily.

S 17. **Pageantry.** Daily, except Sat., hour to be arranged.

Lectures and demonstrations on pageantry. The history of pageantry; its significance and educational value; the relation of history, poetry, song, folk lore, and the drama to pageantry; the organization and administration of a pageant; costume making; and the presentation of a pageant.

S 19. **Swimming.** Daily, except, Sat., hour to be arranged.

Instruction in swimming, life saving, and resuscitation. The various swimming strokes will be demonstrated and taught. The course will be open to a limited number.

Interpretative dancing will be offered in connection with the Fourth Year Aesthetic Dancing.

GENERAL COURSE

S 20. **Practical Course in Calisthenics and Recreation for the Teacher of the One-Room School.** Credit, one hour. Daily, except Sat., 8. Gymnasium. Professor HILL.

Drill in giving response and rhythmic commands, securing responses, graded marching tactics, free gymnastics, mimetic exercises, rhythmical steps, and supervised recreational activities. The various divisions of the State Syllabus of Physical Training and contents will be considered.

(NOTE.—Fourth Year Theory and Practice courses will not be offered in 1918 unless the number of registrants for Fourth Year courses warrant it. Those desiring the Fourth Year courses will please register on or before June 24, 1918.)

PLANT BREEDING

S 1. **Principles and Practices of Plant Improvement.** Credit, two hours. Lectures M W F, 8. Laboratory and conferences W F, 2-4.30. Forestry Building 210. Assistant Professor BARKER.

This is an elementary course designed primarily for teachers, and persons interested in a general way in plant genetics. The laws of variation and heredity and their relation and application to plant improvement will be considered. Laboratory studies in the collection and measurement of variations within certain species, in hybridization and selection and in the laws of segregation and recombination. Laboratory fee, 50 cents.

POMOLOGY

S 1. General Fruit Growing. Credit, three hours. Prerequisites Botany S 1 or its equivalent. Lectures and recitations daily at 11. Roberts Hall 292. Laboratory, M W, 2-4:30. Roberts Hall 202. Mr. HEINICKE.

A study of the methods of propagation and early care of commercial fruits, including the growing of seedlings, cuttings, and layers; principles of budding, grafting, pruning, and planting; soils, varieties, and planting plans for the orchard; cover crops, cultivation, fertilization, spraying, pruning and thinning, as practiced in orchard management; picking, grading, packing, storing, and marketing of fruit. This course considers the apple, pear, quince, cherry, plum, apricot, peach, nuts, and small fruits.

S 2. Advanced Pomology. No credit toward graduation. Prerequisites: Botany S 1 and Pomology S 1, or the equivalent. Lectures T Th S, 9. Roberts Hall 292. Mr. ———.

This course includes a comprehensive study of varieties and judging of fruits and a study of the characters and botanical relationships of the fruits of the United States. Each student is required to collect and mount a number of varieties and species. A trip to Geneva will occupy one afternoon or a Saturday sometime during the course.

POULTRY HUSBANDRY

S 1. The Care and Management of Poultry. Credit, four hours. Lectures, daily, 9. Poultry Building 375. Laboratory T Th F, 2-4:30, Poultry Building 300.

Designed primarily for teachers of agricultural High Schools and other secondary agricultural schools. The course consists of 36 lectures and preliminary examinations, and 18 laboratory practice periods as they would be taught in one term of High School, and includes a general discussion and practical application of the principles of incubation; brooding; rearing; feeding; breeding for constitutional vigor, egg production, and fancy; marketing; housing; and general poultry farm management. Laboratory fee \$3.

S 2. Farm Poultry. Credit, one hour. Lectures, M W, 10, Poultry Building 375. Laboratory Th, 2-4:30, Poultry Building 300.

An abbreviated course dealing with the most important principles of Poultry Husbandry and their application on the farm. Laboratory fee \$1.

S 3. Feeding Practice. Credit, one hour. Must be accompanied by course S 1 or S 2. Practice three 30 minute periods per day, including Sunday, for six weeks; morning 7:30-8:15; noon, 12:45-1:30; night 4:30-5:00. Poultry Building. Mr. ANDREWS.

Practice in feeding for egg production and for fattening; includes preparation for market, record-keeping, and general care and management of fowls. Assigned reading and a written examination will be required. Laboratory fee \$1.

S 3. Incubating Practice. Credit, one-half hour. Must be accompanied by course S 1 or S 2. Practice three 30 minute periods per day, including Sunday, for three weeks; morning 7:30-8:15; noon 12:45-1:30; night 4:30-5:00. Poultry Buildings. Mr. BUCHAN.

Practice in operating incubators; disinfecting, keeping record testing eggs, and general management of the hatch. Assigned reading and a written examination will be required. Laboratory fee \$1.

S 4. Brooding Practice. Credit, one-half hour. Must be accompanied by course S 1 or S 2. Practice three 30 minute periods a day, including Sunday, for three weeks; mornings 7:30-8:15; noon 12:45-1:30; night 4:30-5:00. Poultry Buildings. Mr. BUCHAN.

Practice in feeding, brooding, and caring for young chicks; keeping of temperature, food and growth records. Assigned reading and a written examination will be required. Laboratory fee \$1.

RURAL EDUCATION

S 2. Agriculture in the High School. Credit, two or three hours. Lectures and discussions, daily, 9. Caldwell Hall 282. Laboratory T Th, 2-4:30. Professor TAYLOR.

A course for consideration of curricula, courses of study, school plot, home project, extension work and the preparation of material, as they relate to secondary school conditions. The work will be planned for those who have had technical preparation in agriculture. Lectures may be taken without laboratory work by special permission.

S 3. Development of Agricultural Education. Credit, one hour. Lectures M W F, 10. Caldwell Hall 282. Professor TAYLOR.

Influence of agricultural societies on agricultural education; agricultural education in its relation to the development of the sciences; agricultural legislation and its effect upon agricultural teaching; development of instruction in agriculture in rural schools, secondary schools, special schools, normal schools and colleges; rise and growth of extension teaching; present status of agricultural education.

S 4. Administration and Supervision of Vocational Agriculture. Credit, two hours. Lectures and discussions daily, except Saturday, 8. Caldwell Hall 282. Professors WORKS.

This course is designed especially to meet the needs of state directors of agricultural education. The Smith-Hughes Act is used as a basis for the work. Topics receiving consideration are: types of schools, plans for supervision, preparation of teachers, supervision of home project work, curricula, and courses of study. Visitation of schools is a required part of the course. In addition to the instruction given by the members of the department, lectures will be given by several state directors. L. S. Hawkins, assistant director of the [Federal] Board for Vocational Education will give the lectures for one week.

S 5. The School. Credit, two hours, or lectures only one hour. Lectures M W F, 9; repeated M W F, 11. Laboratory M W, 2:00-4:30; repeated T Th, 2:00-4:30. Farm Management Building. Assistant Professor TUTTLE and Miss SCHOFIELD.

This is a fundamental course for rural teachers, training class teachers, district superintendents, and others concerned with elementary rural education. It is based upon the activities developed in the Cornell Rural School Leaflet which follows the State Syllabus, and is concerned with the place and use in country teaching of nature-study or the child's relation to his environment. It includes a consideration of such phases of the work as natural history; agriculture; home making; collections and exhibits; field trips; school apparatus; neighborhood studies; the school and the home; the school library; the school grounds; the school building; recreation; singing; dramatics; gardening in education; Arbor Day; Corn Day; Farmers' Week; junior project work; and similar topics.

S 6. School and Home Gardens. Credit, one hour. Lectures and discussions M, 11, F, 9. Practice period, M, 2-4:30. Caldwell Hall 282. Mrs. SIPE ALBURTIS.

This course will emphasize the educational value of gardens, their relation to other departments of school activities; the garden as a laboratory for nature-study; class management; vacation gardens; supervision of school and home gardens; and the many problems that arise in the establishment and management of children's gardens.

Teachers planning to teach elementary agriculture and school gardening or those entering upon supervisory work will find it a practical course. Weekly conferences will be held for the discussion of individual problems.

S 7. Practice Teaching in School Gardening. Credit, one hour. Hours by appointment. Mrs. SIPE ALBURTIS.

Students will have opportunity for observation and teaching in the children's gardens. This garden will permit of practical demonstrations of class management in the various seasonal operations; viz., seed planting for succession of crops, transplanting, harvesting, and canning.

RURAL ENGINEERING

S 3. Farm Mechanics. Credit, two hours. Lectures, T Th, 11. Caldwell Hall 282. Laboratory T Th, 2-4:30; S, 8-10:30. Rural Engineering Building. Professor RILEY.

A study of the practical application of the simpler phases of mechanics to agriculture. Laboratory exercises will be given in knots and rope splicing, belt lacing, pumps, hydraulic rams, water supply systems, internal combustion engines, spray machinery, tillage implements, mowers, and grain binders. Laboratory fee, \$2.

S 4. Woodwork for the Rural School. Credit, one hour. T Th, 2-4:30; Sat., 8-10:30. Woodshop. Mr. ROEHL.

An elementary course adapted to use in the country school. Subjects considered are suitable tool and bench equipment and the application of tool operations to the making of useful school and farm appliances.

SCHOOL GARDENING

The demand for increased food production which has come as a result of the war has greatly stimulated the interest in school and home gardening. As a consequence there is a pronounced demand for trained men and women to act as supervisors of this work. The New York State College of Agriculture offers the following courses for persons who desire to prepare for such positions:

First Year

Course	Credits	Page
Vegetable Gardening S 1	3	73
Floriculture S 1	1	57
Soils S 3	1	72
Nature Study S 1	2	60
Rural Education S 6	1	71

Second Year

Course	Credits	Page
Vegetable Gardening S 2	1	73
Floriculture S 3	1	57
Nature Study S 5	2	61
Plant Breeding S 1	2	68
Rural Education S 7	1	71

Persons who satisfactorily complete the two years of work will be given a certificate of proficiency.

Mrs. Sipe Alburtis will be in Room 294, Caldwell Hall, during registration days to advise with students regarding preparation for this work. Those desiring further information in advance of the opening of the summer school may write to Professor George A. Works, College of Agriculture, Ithaca, N. Y.

SOIL TECHNOLOGY

S 3. Soils. Three periods. Credit, one hour. Lectures, W F, 11. Caldwell Hall 143. Laboratory and demonstrations, T, 2-4:30. Professor BEAUMONT.

This course is not open to regular students in the college nor will students taking this course be permitted to apply it toward credit on any regular course of the department. It is designed primarily for students taking gardening and others must obtain permission before registering.

A practical, fundamental course in soils. The subject will be handled with special reference to the needs of those expecting to teach soils in secondary schools. The lectures will include a discussion of the formation and classification of soils, tilth, soil moisture, soil biology, soil amendments, manures and fertilizers, and practical soil management. The laboratory once a week will give opportunity for questions and practical discussions.

VEGETABLE GARDENING

VEGETABLE GARDENING

S 1. Vegetable Gardening. Credit, two hours. Lectures, T Th F, 8, M W, 9. Poultry Building 325. Laboratory, T Th, 9-12. Vegetable Gardens, East Ithaca.

This course is planned primarily to meet the requirements of those interested in school and social service work in vegetable gardening, as well as of the amateur gardener.

The location, planning, and management of a garden; seed and seed handling; growing early plants; special requirements of the various vegetable crops; and insects and diseases will receive consideration.

The laboratory work includes actual practice in the garden. Each student is assigned a plot on which he will plant and care for throughout the course the vegetables which are best suited for amateur gardens.

Laboratory fee, \$2.00.

S 2. Advanced Vegetable Gardening. Credit, one hour. Prerequisite Course S 1. Lectures T Th, 9. Poultry Building 325. Laboratory T, 2-4:30, Vegetable Gardens, East Ithaca.

Lectures on the origin, history, and botany of vegetables. Lectures and laboratory studies of different varieties, their characteristics and adaptation to different conditions. Important varieties of all the different vegetables are grown in the garden giving an abundance of material for study. Preparing and judging exhibits. Growing of vegetable seeds—selection, harvesting, and curing.

Special study of intercropping schemes. Training, blanching, and harvesting different vegetables.

One or two trips will be made to study the most successful home gardens of Ithaca.

Laboratory fee, \$1.50.

For announcement of courses in School Gardening see p. 71.

S 5. Preservation of Perishable Crops. Credit, three hours. Lectures daily, 12-1. Poultry Building, Room 325. Laboratory, M W Th, 2-4.30. Home Economics Building and East Ithaca Gardens. Assistant Professor KIRKPATRICK.

A course dealing with the principles and methods of preserving surplus garden and orchard products. Storing, canning, drying and salting of various crops are considered mainly from the "community" standpoint. Commercial methods of canning, pickling and kraut making will be studied briefly. Laboratory fee \$7.50. Registration limited to 20 students.

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The Annual Register (for the year 1917-18, published January 1, 1918), price 50 cents.

Book of Views, price 25 cents.

Directory of Faculty and Students, Second Term, 1917-18, price 10 cents, and the following informational publications, any one of which will be sent gratis and post-free on request. The date of the last edition of each is given after the title.

General Circular of Information for Prospective Students, December 15, 1917.

Announcement of the College of Arts and Sciences, March 15, 1917.

Announcement of Sibley College of Mechanical Engineering and the Mechanic Arts, February 1, 1918.

Announcement of the College of Civil Engineering, April 15, 1917.

Announcement of the College of Law, May 15, 1917.

Announcement of the College of Architecture, July 1, 1917.

Announcement of the New York State College of Agriculture, June 1, 1917.

Announcement of the Winter Courses in the College of Agriculture, June 15, 1917.

Announcement of the Summer Term in Agriculture, April 1, 1917.

Announcement of Instruction in Wild Life Conservation and Game Breeding, January 15, 1918.

Announcement of the New York State Veterinary College, May 1, 1917.

Announcement of the Graduate School, February 15, 1917.

Announcement of the Summer Session, March 1, 1918.

Annual Report of the President, September 1, 1917.

Pamphlets on prizes, August 1, 1917.

Samples of entrance and scholarship examination papers, December 1, 1917.

Announcement of the Medical College may be procured by writing to the Cornell University Medical College, Ithaca, N. Y.